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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 732.] SATURDAY, JULY 5, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
The Chemistry and Botany of the Strychnos Nux-Vomica Indigenous to Ceylon. By W. R. Dunstan and F. W. Short	1
EDITORIAL ARTICLES AND NOTES:—	
The Resignation of Mr. Bremridge	7
The British Pharmaceutical Conference	7
Notes:—Medical Acts Amendment Bill—Society of Chemical Industry—International Pharmacopœia—Edinburgh Chemists' Assistants and Apprentices' Association—Chinese Materia Medica—A Caution	8
TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY:—	
Meeting of the Council:—	
Election of Members, Associates and Apprentices	9
List of Local Secretaries	10
Reports of Committees	11
Grants from the Benevolent Fund	12
Retirement of Mr. Bremridge	14
Medical Acts Amendment Bill	17
PROCEEDINGS OF SCIENTIFIC SOCIETIES:—	
School of Pharmacy Students' Association	18
Chemists' Assistants' Association	18
International Health Exhibition:—	
Conferences on Sanitary Legislation	18
OBITUARY:—	
Henry Watts, F.R.S.	19
CORRESPONDENCE:—	
The Prosecution at Sheffield	20
Answers to Correspondents	20

Pharmaceutical Society of Great Britain.

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

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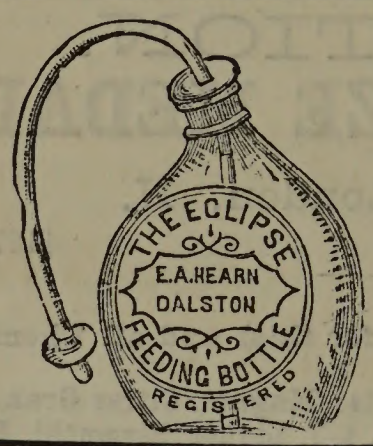

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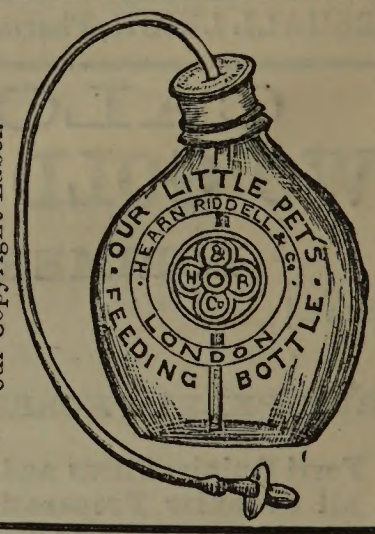

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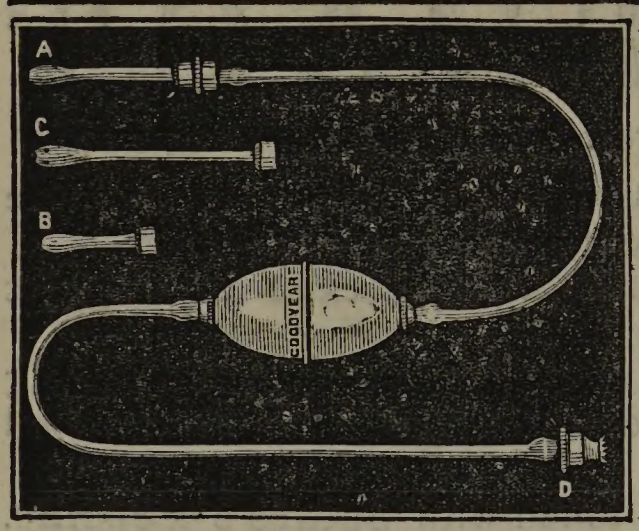

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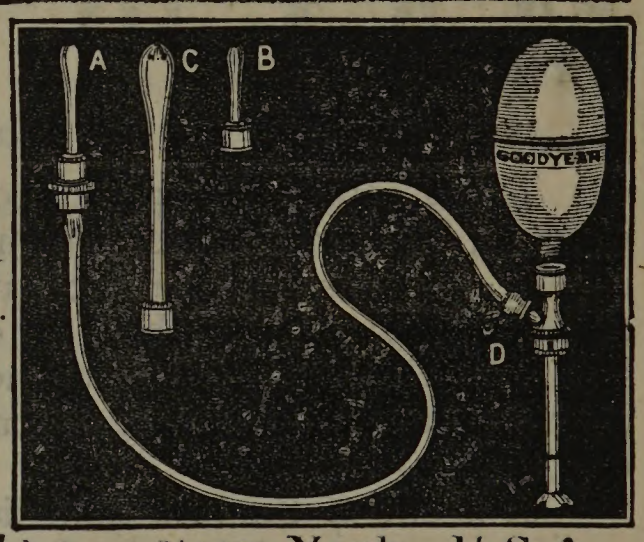

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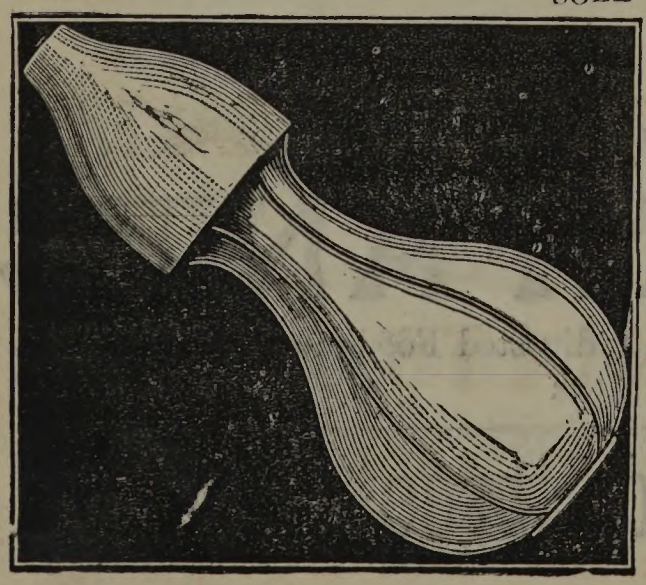

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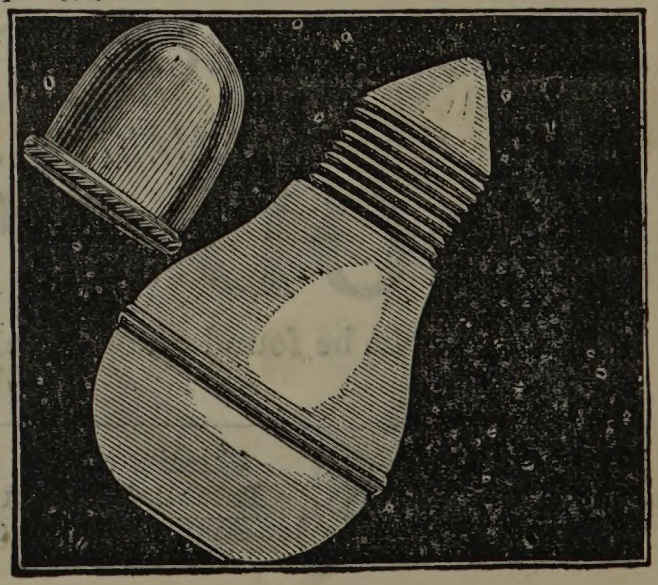

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GUARANTEED PURE SOLUBLE COCOA, of the finest quality, without Sugar or admixture.

The high degree of Solubility and perfect Purity attained *is solely* due to the careful manipulation and delicate MECHANICAL treatment of the finest quality of Cocoa Beans, the *excess* of fat being extracted.

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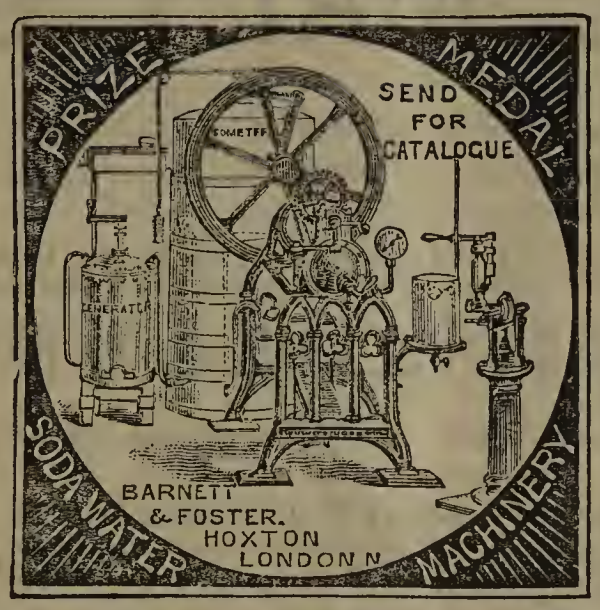

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Our Machines are universally adopted throughout the world for the manufacture of all kinds of Aërated Drinks, whether in bottles, syphons, or counter fountains. There are in England alone over 2,000 factories where our Machinery is in use. They are the simplest, safest, and cheapest for the purpose, and produce a highly charged gaseous water free from metallic or foreign contamination.

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Strongly recommended by the most distinguished Medical Authorities, and being considered a Preparation of the highest merit, is not to be confounded with other makes of the same and similar descriptions.

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Choice quality, Hambro' speckled and Officinal Green. A constant supply always on hand. Delivered free to all parts of London daily.

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PANCREATIC EMULSION

OR PEPTONISED (PREDIGESTED) FAT,

LARGELY PRESCRIBED AS THE SPECIAL FORM OF NUTRIMENT ESSENTIAL IN ALL CASES OF

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The special advantage of Pancreatic Emulsion is that it provides the NATURAL STABLE SOLID FATS OF FOOD, predigested by the action of the pancreatic secretion, so that they can be taken without the least disturbance of the digestive functions. As it provides SOLID fat, it is well to make it alternate with a liquid fat, like cod-liver oil, even where the latter agrees, and in many cases where cod-liver oil disagrees it may be permanently substituted with the greatest advantage, or it may be taken with the oil, the assimilation of which it actively promotes.

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		White Fittings.			Black Fittings.		
Alexandra, Earthenware Caps - -	*per doz.*	—	7/6	11/-	—	8/6	12/-
Alexandra, Earthenware Screw Stoppers	„	—	—	11/-	—	—	12/-
Alexandra, Glass Screw Stoppers -	„	4/-	7/6	11/-	4/9	8/6	12/-
Export, China or Wood Top Corks -	„	3/6	—	—	4/	—	—
Export, 2nd Quality, Wood Top Corks	„	2/9	—	—	3/6	—	—
Export, Earthenware Caps - -	„	—	7/3	—	—	8/3	—
Export, Glass Screw Stoppers - -	„	4/-	7/6	—	4/9	8/6	—

FOR FURTHER PARTICULARS SEE QUARTERLY PRICE CURRENT, pages 69 and 70.

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TRADE MARK.

A New Absorbent and Antiseptic Dressing Material.

Patented and Manufactured by PAUL HARTMANN.

Acknowledged to be the most efficacious, cleanest, and cheapest dressing.

This Material created on its appearance in this country a DEEP interest in the surgical profession, and its STRIKING advantages and GREAT merits as an absorbent and antiseptic dressing have been fully recognised by the most Eminent Authorities of the British Medical Profession.

Hartmann's Patented Wood Wool is now already largely used in the leading London Hospitals; among others being the St. Thomas's, Guy's, London, German, Training, &c., Hospitals.

Sir WILLIAM MAC CORMAC, F.R.C.S., writes under date, March 6th, 1884:—"I am much satisfied, so far, with the trial I have made, and I think this Sublimate Wood Wool will be extensively used."

The BRITISH MEDICAL JOURNAL of Feb. 23rd, 1884, on pages 363 and 367, reports from the meeting of the Military Medical Society, Woolwich, on Feb. 15th, "Antiseptic Surgery in its application to Field Service," that it was mentioned on that occasion nothing was known to possess such absorbent properties as Wood Wool, and that it was by far more absorbent than cotton wool or tow, or, in fact, any other material of that kind. It was further thought that from its cheapness and softness it was destined to play an important part in surgical dressings in the future.

The LANCET'S Correspondent from Ireland, in the issue of that paper of April 12th, 1884, page 684, says that Dr. Ormsby, of the Meath Hospital in Dublin, has recently been using Wood Wool dressing after operations, and speaks highly of it.

The following is an extract of a letter of Dr. Lediard, of Carlisle, in the LANCET of April 19th, 1884, page 731, about Wood Wool:—

"I have merely applied the material itself to wounded surfaces, and not in muslin bags, nor impregnated with antisepties. As a dressing for recent wounds it is easily applied, is painless and comfortable, and will be found by no means an unimportant styptic. For granulating wounds its absorbent and antiseptic properties procure a cleanly, healthy surface, and appear to promote cicatrisation. For instance, in a case of amputation of the leg, where, owing to putrefaction, the Listerian dressings had to be discontinued, the stump was surrounded with a quantity of the Wood Wool, and the discharge was readily absorbed and sweetened, whilst the granulations assumed a healthy character. I believe that this material will be found very serviceable in the casualty department of large hospitals, owing to the facility with which it can be applied; *whilst, from a financial point of view, it may be found far more economical than even lint dressing.*"

The BRITISH MEDICAL JOURNAL of May 3rd, on p. 864, comments upon Wood Wool, amongst others, in the following terms:—"It is *in many respects* suitable as a surgical dressing material; so far as our experience goes of its power of taking up discharges, it seems to be *more absorbent* than the common absorbent cotton wool, so that liquids, which are brought into contact with it, appear to be soaked up in a *very cleanly fashion*, and covered with a thin gauze, it should make up into very useful dry absorbent pads for wounds."

At the General German Hygienic Exhibition, held at Berlin in 1883, the Patentee of Wood Wool and Manufacturer of Dressing Materials, PAUL HARTMANN, of Heidenheim (Wurtemberg), Germany, was awarded the **ONLY** GOLD MEDAL of HER MAJESTY the EMPRESS AUGUSTA, for the best Dressing Material exhibited.

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who supply all the Wholesale Houses.

Samples and Pamphlets gratis and post free on application.

N.B.—For the convenience of Surgeons, for private practice, we are now prepared to supply Wood Wool in 1lb. Bags.

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HARTMANN'S

HYGIENIC WOOD WOOL DIAPERS

TRADE MARK.

A great boon for Health, Comfort, Convenience, and Cleanliness.

UNEQUALLED & UNRIVALLED FOR GENERAL USE & ACCOUCHEMENT

The Medical Profession fully recognises the unequalled value of WOOD WOOL as an absorbing and Antiseptic Agent. It is, therefore, particularly suited for the manufacture of these Diapers.

In their construction we have acted upon the suggestions of an eminent London Obstetric Physician, who, after repeated trials of them among his patients, now pronounces HARTMANN'S HYGIENIC WOOD WOOL DIAPERS perfect in material and form, and the most convenient, comfortable, and healthful appliance ever provided for this special purpose.

The essential requirements in Diapers are the rapid and thorough absorption of all secretions and the prevention of odours resulting from decomposition.

Nothing hitherto produced answers these requirements so perfectly as HARTMANN'S HYGIENIC WOOD WOOL DIAPERS.

The following are a few of the many advantages which the material employed in the manufacture of **Hartmann's Hygienic Wood Wool Diapers** possesses over any other known substance, AND ESPECIALLY OVER COMMON ABSORBENT COTTON WOOL.

(1.) Hartmann's Patented Wood Wool has an enormous capacity of absorption, so that as a rule the use of **One** of **Hartmann's Hygienic Wood Wool Diapers** will be found **equal** for all practical purposes to **many** of the ordinary or any other kind.

(2.) All disagreeable odours, and the decomposition of the secretions, are **entirely** and **effectually** prevented, owing to the antiseptic properties of the material.

(3.) The Diaper is very **light**, and will always remain **flexible** and **soft**—an important advantage over the ordinary diaper, which is necessarily heavy, hot, and liable to chafe the skin during its use, **all of which disadvantages are entirely avoided** in using **Hartmann's Hygienic Wood Wool Diapers.**

(4.) As the watery secretions can freely evaporate, the Diaper will always feel **dry** and remain **soft.** This is due to the nature of the material employed, and adds greatly to the comfort of the wearer. The Diaper also being constantly **cool,** offers a striking feature which **no other** Diaper, or anything of the kind possesses.

(5.) The ease with which it is applied to the waistbelt is likewise a great convenience.

(6.) The moderate price at which they are sold, bringing them within the reach of everyone, will allow their destruction after use, by simply burning them—a fact which, from a **sanitary** and **economical** point of view (**as washing is dispensed with**), is of the utmost importance.

N.B.—The burning of the Diaper can be effected at any convenient time. The antiseptic properties of the material will prevent any smell whatsoever, while being kept after use, until convenient to be burned. The latter process is also entirely free of any kind of smell.

In addition to these advantages, we point out the great convenience and comfort these Diapers afford Ladies travelling, as the carrying about of Soiled Linen is entirely avoided—another important fact, which must be obvious to everyone.

For protection against useless and injurious imitations, the label of each package and every single Diaper bears the NAME and TRADE MARK of the Patentee and Manufacturer of **Wood Wool—PAUL HARTMANN, Heidenheim,** whose Patent Rights are rigidly protected.

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Hygienic Exhibition, Brussels, 1876.
Exhibition of the IX. Medical Congress, Genoa, 1880.
Exhibition, Stuttgart, 1881. GOLD MEDAL.
Hygienic Exhibition, Berlin, 1883. GOLD MEDAL.
Inter. Pharm. Exhibition, Vienna, 1883. GOLD MEDAL

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Your attention is invited to the following Opinions of Pharmacists:

From **Messrs. MACKENZIE & Co., Dispensing Chemists,** EDINBURGH.

The **Concentrated Liquors** for making Syrups, which we have had from you, give us entire satisfaction. They are so convenient for retail chemists in dispensing, and so long as they are prepared with the same care and purity, they cannot fail to meet the increasing demand for chemical preparations in this form.

Yours very truly
J. Mackenzie & Co.

July 16, 1881.

From **Mr. A. G. RICKARBY, Pharmaceutical Chemist,** WALTON-ON-THE-NAZE.

Speaking from a practical point of view, I consider your **Concentrated Liquors** a perfect boon to provincial chemists, who are occasionally called upon to dispense prescriptions that have been previously dispensed by the large dispensing establishments in London, as they are thus enabled to vie with them in producing, without extra expense or trouble, fresh Syrups of uniform colour. Without your **Concentrated Liquors** I consider no provincial chemist's stock is complete.

Yours truly
Arthur G. Rickarby

November 9, 1883.

From **Mr. HORACE THOMAS, Pharmaceutical Chemist,** ST. LEONARD'S.

I have used several of your **Liquors** for the last twelve months with great satisfaction, having found them most useful, convenient, and economical. The loss from keeping some of the Syrups made, particularly those containing iron, used to be considerable—a loss which your Liquors have entirely removed; not to mention the great advantage of having the Syrups of a uniform colour.

Yours faithfully
Horace Thomas

July 9, 1881.

From **Mr. A. E. REMINGTON, Dispensing Chemist,** WELLINGTON, N.Z.

I have had the pleasure of trying your *Liq. Ferri Iodid.*, *Liq. Ferri Phosph.*, *Liq. Eastoni.*, *Liq. Tolut.*, and one or two others, and finding that to once use them creates a want, I should like to stock them on the most favourable terms to myself and introduce them to brother druggists. I may say that, on first reading your advertisements, I was sceptical as to the medicinal value of such **Concentrated Liquors,** but am happy to state that, having used them now for over twelve months, I am so convinced of their stability and reliability that I intend to make all my Syrups for the future with your Liquors.

Faithfully yours
A. E. Remington

September 7, 1883.

Trial Supplies free of cost on application to the Sole Manufacturers:

FLETCHER, FLETCHER & STEVENSON,
Holloway, London, N.

The
Pharmaceutical Journal
AND
Transactions.

VOL. XV.—JULY 5, 1884.

THE CHEMISTRY AND BOTANY OF THE STRYCHNOS NUX-VOMICA INDIGENOUS TO CEYLON.

BY WYNDHAM R. DUNSTAN,

Assistant Lecturer in Chemistry and Physics to the Pharmaceutical Society and Demonstrator of Practical Chemistry in the School of Pharmacy;

AND F. W. SHORT,

Assistant Demonstrator of Practical Chemistry in the School of Pharmacy.

In a previous paper (*Pharm. Journ.*, [3], xiii., 1053) we have described the results of a chemical and botanical examination of the seeds of *Strychnos Nux-vomica* which come into England under the names of "Bombay," "Cochin," and "Madras." The results of this investigation indicated that the "Bombay" seeds, which were at once the largest ($\delta = 20-22$ mm.) and finest in appearance, contain the greatest quantity of alkaloid. In one case, a specimen of the "Bombay" seeds yielded the highest amount (3·9 per cent.) of total alkaloid that had yet been recorded as occurring in the seeds of *Strychnos Nux-vomica*. The "Cochin" seeds were next in order of size ($\delta = 19-28$ mm.), and were also found to occupy a corresponding position in reference to alkaloidal content. Lastly, the "Madras" seeds were the smallest in size ($\delta = 12-21$ mm.), as well as in alkaloidal content. In addition to the size it was noticed that the exterior of the seeds containing the most alkaloid had a very silky texture, due to the presence of hairs adpressed to the surface of the seed; this was particularly the case with the "Bombay" seeds, and on the other hand the silky texture was quite absent from the seeds containing the smallest amount of alkaloid, namely, "Madras." Acuteness of edge also appeared in certain cases to be associated with a large alkaloidal content.

This co-existence of certain well-defined botanical characters in the seeds with the presence of a large quantity of alkaloid was observed alike in two entirely distinct sets of specimens, the one collected in the year 1877, the other in the year 1883.

This being the case we commenced a botanical examination of such dried specimens of the plant as were available in this country, with the object of ascertaining whether these differences in botanical characters, corresponding to a variation in alkaloidal content, were due merely to a more or less advanced stage of development of the seeds, or whether the differences arose from the seeds originating from more than one species of the plant. This endeavour proved to be futile, for the reason stated in the paper referred to, the absence in this country of authentic specimens of the entire plant, including the fruit and seeds.

Soon after the publication of our results, Dr. W. C. Ondaatje, F.L.S., of Galle, Ceylon, well known as an ardent botanical worker, most kindly offered to collect specimens of the plant which is indigenous to Ceylon, to carefully select fruit and assort the seeds for a chemical analysis. We at once availed ourselves of this very generous offer, and the present paper is the outcome of a chemical and botanical investigation of the specimens forwarded to us with descriptive notes and drawings by Dr. Ondaatje.

The Plant.—The *Strychnos Nux-vomica* grows in the hotter parts of the island of Ceylon, and coincides in general features with the description of the

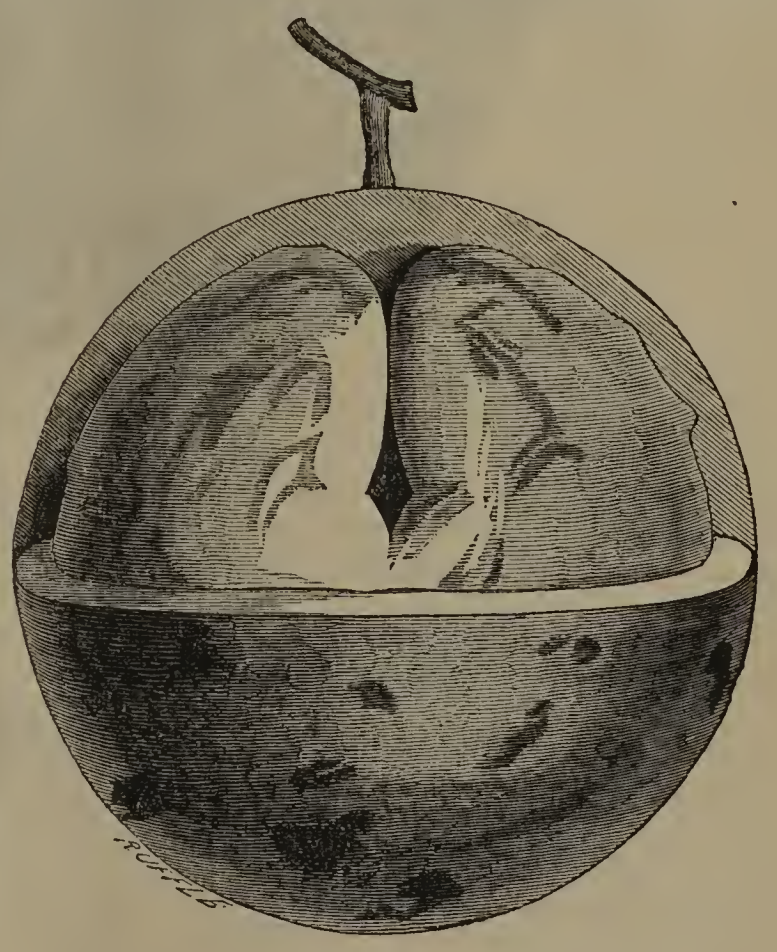

Fig. 1.

tree from other localities, which is given by Roxburgh and others. The appearance of a branch of the tree with leaves and fruit is seen from the woodcuts (figs. 2 and 3), which are taken from a drawing,* by Dr. Ondaatje, of a tree growing in the Hambanlota district, south of Ceylon, an arid and barren country, only important on account of the natural salt formations which occur there and yield a large revenue.

* The original drawing, which is coloured, has been presented to the Museum of the Pharmaceutical Society.

Fig. 2.

The Leaves.—These are ovate, acuminate, and trinerved. The largest leaves from the tree sketched measured 86·8 mm. in length, from stalk to apex, and 46·5 mm. in breadth; the smallest leaves measured 25 mm. in length, and 11·4 mm. in breadth. The leaves, however, appear to vary much in size, although the drawing and above measurements represent typical specimens. Larger leaves from other trees were found to measure from 98·8 mm. to 118 mm. in length, and from 57·5 mm. to 75 mm. in breadth.

The Fruit.—The fruit, the appearance of which is well represented in the drawing (figs. 1 and 3), contains the seeds imbedded in a white gelatinous pulp. It varies in size, the same tree often exhibiting both large and small fruits on the same branch. The unripe fruit is green and hard; the ripe fruit has a deep orange colour, and the pericarp cracks when pressed. The largest fruits are about the size of a small orange, and the biggest one examined had a diameter of 56·5 mm. The following are the dia-

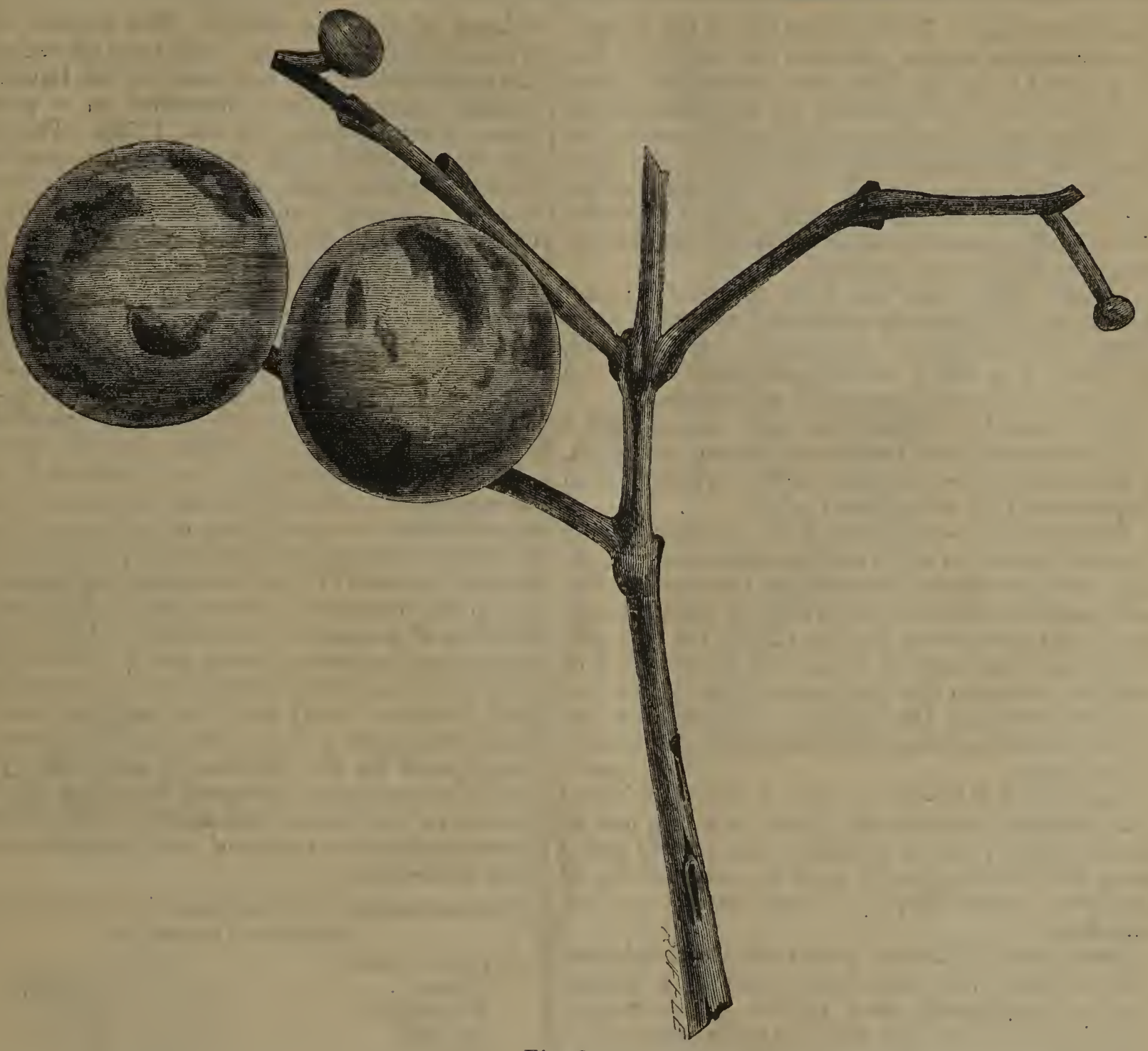

Fig. 3.

metrical measurements of typical fruits and the numbers under which they are subsequently designated:—

No. 1 (fig 1). . .	52 millimetres.	
No. 2	35 „	(usual size).
No. 3 (fig 3). . .	29·5 „	
No. 4	25 „	

The larger fruits weighed, when freshly gathered, from 78 to 142 grams, and the smaller fruits from 4 to 12 grams. Within the fruit is a pulp in which the seeds are vertically arranged. This pulp has a very bitter taste, and when fresh is white, but on drying becomes dark brown; the fresh pulp when immersed in alcohol yields an indigo-blue solution.

The quantity of pulp contained in the typical fruits was as follows:—

No. 1 fruit. Average amount of pulp, 40 grams.
No. 2 fruit. Average amount of pulp, 33 grams.
No. 3 fruit. Average amount of pulp, 10·5 grams.
No. 4 fruit. Average amount of pulp, 2 grams.

It is stated by the highest authorities that the pulp has no toxic action, and in fact constitutes the food of many birds. Thus Roxburgh,* "the pulp of the fruit seems perfectly innocent, as it is eat greedily by many sorts of birds." Beddome† says the fruit is quite harmless, and the favourite food of many birds. Again, Drury,‡ "the pulp of the fruit is harmless. Birds eat it greedily." According to Cleghorn,§ the pulp is eaten by the hornbill (*Buceros malabaricus*). Bentley* quotes Roxburgh to the effect that the pulp is harmless. Flückiger and Hanbury† rendered these statements unintelligible by showing that both the fresh and inspissated pulp contained strychnine. In view of these conflicting statements we considered it desirable to ascertain exactly the physiological action of the pulp. The following physiological experiments were made by Dr. Ondaatje at the Hambanlota Hospital, Ceylon.

Experiment I.—The pulp of a large fruit mixed with about half an ounce of water was given to a large cat. In five minutes tetanic convulsions set in, the body was flaccid, the extremities flexed and rigid. The animal passed an involuntary motion after the first attack, and after successive attacks died within ten minutes of the administration of the pulp. A *post-mortem* examination was made shortly after death. The lungs were congested, the left ventricle of the heart contained fluid blood, but the right ventricle contained clots; the liver was rather congested, the stomach distended with gas, the intestines corrugated. The tongue protruded from between the firmly clenched jaws.

Experiment II.—5·6 grams of the fresh pulp mixed with half an ounce of water was given to a dog about two months old. After eight minutes the posterior extremities became stiff; tetanic convul-

* 'Plants of Coromandel,' 9. † 'Flora Sylvatica,' 243.
‡ 'Useful Plants of India,' 407. § 'Pharmacographia,' 384.

* 'Manual of Botany.' † 'Pharmacographia,' 384.

sions supervened. The dog then fell on the ground, the extremities became extended and stiff, and the body ceased to move. The jaws opened and closed as if the animal were gasping for air, trembling of the whole body occurred, an involuntary motion was passed and the animal died—eighteen minutes after the administration of the pulp. A *post-mortem* examination showed that the right and left ventricles of the heart contained coagulated blood, and that the lungs and liver were congested.

In both these cases the toxic action of the pulp was proved, the animals exhibiting the usual symptoms of poisoning by strychnine. As, however, the pulp was stated to have no poisonous action upon birds, further experiments were made.

Experiment III.—Some fresh pulp mixed with a little water was given to a pigeon without any result.

Experiment IV.—The pulp given to a pigeon, as in Experiment III., without any effect.

Experiment V.—0·3 gram of the inspissated pulp was adminstered to a frog and produced no effect. As the quantity of alkaloid contained in the amount of inspissated pulp administered to the frog was extremely small, and considering the fact that in the first pulp which was administered to pigeons there would be still less, owing to the large quantity of water present, we requested Dr. Ondaatje to repeat the two last experiments, using larger and weighed quantities of the pulp.

Experiment VI.—2·6 grams of the inspissated pulp dissolved in water was given to a frog and no effect followed, but on administering twenty grains more convulsions speedily came on, commencing at the lower extremities, and death resulted in forty minutes.

Experiment VII.—2·0 grams of the inspissated pulp mixed with water was given to a pigeon. Almost immediately after violent tetanic convulsions set in and the bird died in twelve minutes.

These experiments conclusively demonstrate the poisonous nature of the pulp, and show that its action is mainly, if not entirely, due to the strychnine which it contains. Birds can no doubt consume a certain quantity of the fresh pulp with no fatal effects, for the proportion of strychnine present in the semi-liquid mass is not large, as subsequent analysis shows. Obviously, if eaten to more than this extent, fatal results will ensue.

The conclusions from these physiological experiments were strictly confirmed by a chemical examination of the pulp. For this purpose the inspissated pulp was used, which was prepared in the following way:—The gelatinous pulp was squeezed from the seeds into a wooden bucket, when dirt and other foreign matter was removed, after which the semi-liquid pulp was dried in the sun for one month. The partially hardened mass was then flattened out on a plate and again dried in the sun for one month. A dark-brown firm cake of pulp was then obtained, having a slightly aromatic odour. This was submitted to chemical analysis. We have already (*Pharm Journ.*, [3], xiv., 1025) described a new glucoside called loganin, which was obtained from this pulp.* In order to estimate the alkaloidal constituents the pulp was dried at 100° C., when it lost 22 per cent. of water. The dried pulp was finely powdered and exhausted in an extraction apparatus with boiling chloroform containing 25 per cent. by volume of absolute alcohol. The loganin which crystallized as the percolate cooled was filtered off and the total alkaloid was estimated in the liquid by a process which has been described in a previous paper (*Pharm. Journ.*, [3], xiii., 1053). The liquid was well agitated with two successive portions of dilute sulphuric acid, and the alkaloid extracted from the aqueous liquid by chloroform after excess of ammonia had been added. Any loganin which was not removed by crystallization remained in the ammoniacal liquid. The amount of residue obtained corresponded to 2·4 per cent. of total alkaloid in the dried pulp. This residue of total alkaloid was now qualitatively tested and found to contain both strychnine and brucine, which were separated by the process that we have described in a former paper (*Pharm. Journ.*, [3], xiv., 290), which is based upon the difference in the solubility of strychnine and brucine ferrocyanides. About 0·2 gram of the total alkaloid was dissolved in about 10 c.c. of a five per cent. (by volume) solution of sulphuric acid, the liquid was diluted to about 175 c.c. with water, and then made up to the volume of 200 c.c. with a five per cent. solution of potassium ferrocyanide. After constant stirring and agitation during four hours the precipitate was filtered off and washed with dilute sulphuric acid (0·23 per cent.) until the washings were free from bitterness. The moist precipitate was then decomposed by the addition of ammonia hydrate, and the strychnine extracted from the liquid by successive portions of chloroform. The following table exhibits the results of the chemical examination of the pulp.

Chemical Analysis of the Inspissated Pulp of the Fruit of Strychnos Nux-vomica.

100 parts contain:—

Water	22·0	parts
Strychnine	1·4	,,
Brucine	1·0	,,
Loganin	5·0	(nearly)
Ash (K_2CO_3, Na_2CO_3, $CaCO_3$, Li_2CO_3, etc.)	5·0	,,
Fixed Oil, Mucilage, Gum, etc.	65·6	,,

It will be observed that the proportion of strychnine to brucine in the pulp is much higher than in the seeds, the strychnine constituting more than one half of the total alkaloid.

The Seeds.—The largest fruit examined contained fourteen seeds, of which seven were abortive. Another large fruit contained ten seeds, of which one was abortive. The number of seeds was counted in a great many specimens of fruit.

Five hundred and ninety-three fruits were gathered and examined. There were of—

No. 1, 108 which contained 434 normal seeds and 52 abortive seeds.

No. 2, 245 which contained 468 normal seeds and 52 abortive seeds.

No. 3, 165 which contained 190 normal seeds and 7 abortive seeds.

No. 4, 75 which contained 77 normal seeds and 21 abortive seeds.

The number of seeds found in the typical fruits was as follows:—

No. 1 contained from 2 to 9 seeds, usual number 4.

No. 2 generally contained 2 seeds, sometimes 3 and 4, with abortive ones.

No. 3 generally contained 1 large seed, rarely 2.

No. 4 generally contained 1 large and 1 small seed. When 2 seeds occur both are generally abortive, or

* A specimen of loganin is now in the Museum of the Pharmaceutical Society.

Fig. 4.

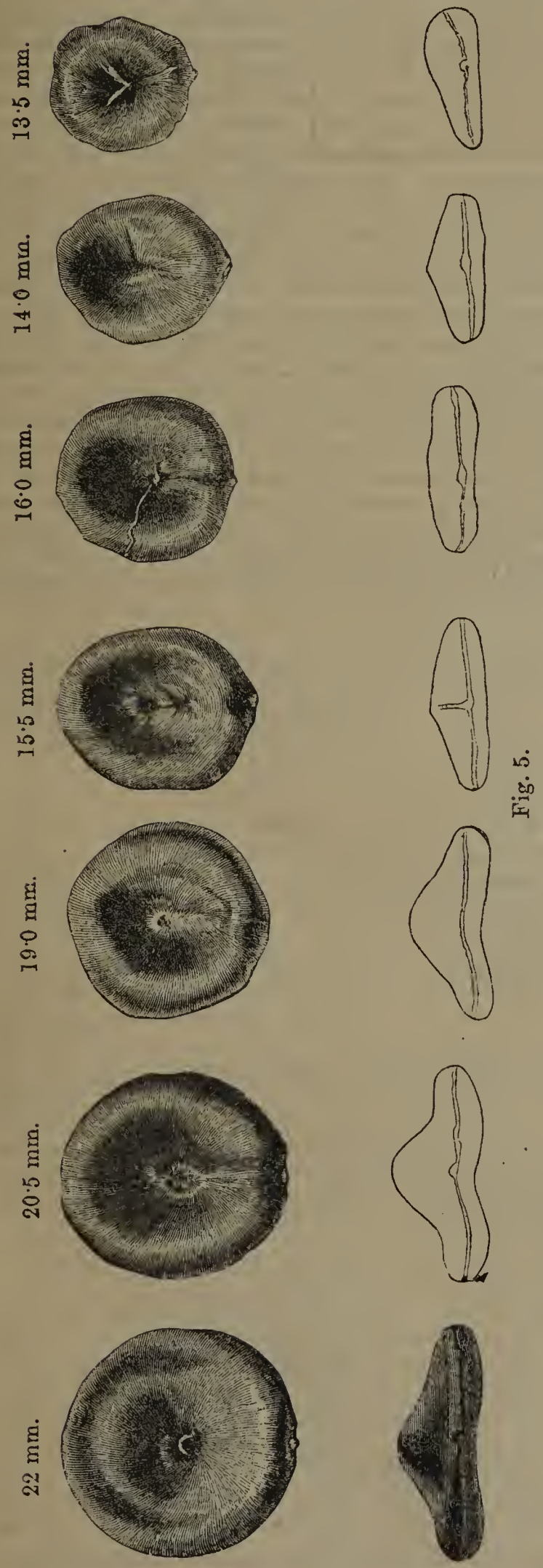

Fig. 5.

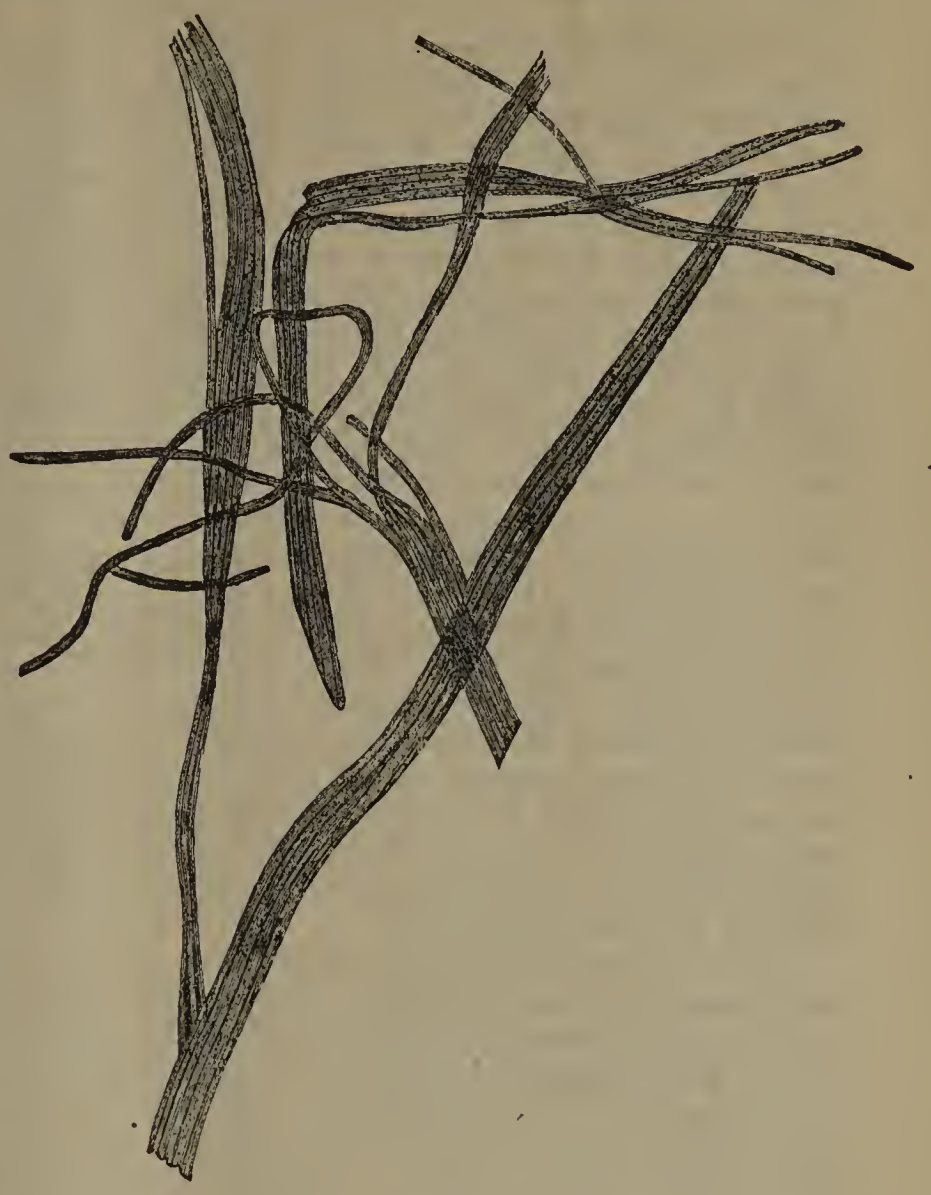

Fig. 6.

sometimes the smaller seeds alone is normal. The large and small seeds occur in the same fruit. Thus, a specimen of—

No. 1 contained 3 large seeds, 1 small seed, with 4 abortive seeds.

No. 2 contained 2 large and 2 small seeds, none abortive.

No. 3 contained 2 large and 2 small seeds, none abortive.

No. 4 contained 1 large and 1 small seed, none abortive.

The seeds had a silky exterior and were found to be coated with fine hairs. These hairs, which consist of elongated cells of the testa, exhibit an extremely interesting structure when examined microscopically. Their structure has often been described, but we are not aware that they have ever been sketched. The woodcut (fig. 6) is from a drawing by Dr. Ondaatje. The large seeds weighed from 2 to 2·5 grams, the smaller seeds from 1 to 1·5 grams. The diameter of the seeds ranged from 13·5 to 22 mm., the circumference from 44 to 66 mm., the thickness from 3 to 5 mm. The edges were usually rounded (*Cf.* fig. 5 and appended table). A chemical analysis of the seeds was now made. They were dried at 100° C., powdered, and the total alkaloid estimated by the process which we have previously described. In the first place average specimens of the seeds contained in the typical fruits were analysed (see appended table).

In considering the results obtained, several factors have to be taken into account. It has already been seen that the biggest fruits do not contain the largest seeds; thus the average seeds of both No. 1 and 2 fruits are about the same size, but the number of seeds contained in these two fruits is not the same.

No. 1 fruit commonly contains four seeds, but No. 2 fruit usually contains only two seeds. It will be seen from the analyses that other things being equal the fewer the number of seeds in the fruit the more alkaloid the seeds contain. Thus the average seed from No. 1 and 2 fruits is about the same size, but No. 2 fruit only contains half as many seeds and it is found that the seeds of the latter fruit contain more alkaloid than those of the former. Fruit No. 3 contains seeds, an average specimen of which is slightly smaller than the seeds from fruit No. 2; but the former fruit usually contains only half as many seeds as the latter, in fact, commonly only one seed is present. It is seen that the seeds from fruit No. 3 contain more alkaloid than the seeds from fruit No. 2. Finally, the average seed from fruit No. 4 is decidedly smaller than the seeds from any of the preceding fruits, but as this fruit usually contains but one seed, this compensates to a certain extent for deficiency in size, and it is noticed that these seeds contain rather more alkaloid than the seeds from fruit No. 1, although this fruit yielded seeds which were larger. The proportion of strychnine is fairly constant, being a little more than one-third of the total alkaloid.

We now made further analyses to elucidate the important question alluded to in the early portion of this paper, namely, whether increase in the size of the seed corresponded with an increase in alkaloidal content. For this purpose the largest seeds were selected from fruit No. 1 and also the smallest seeds from the same fruit; these two sets of seeds were then separately analysed, with the results recorded in an appended table. These results conclusively show that the largest seeds contain the greatest amount of total alkaloid, although the increase in alkaloid in the present instance has been in brucine, the quantity of strychnine in both seeds being the same. This latter point deserves fuller investigation in other specimens.

General Bearing of the Investigation.—The principal experimental results of this inquiry are summarized in the appended tables. Apart from minor points that have been elucidated, the following important conclusions have been arrived at:—

The poisonous nature of the pulp of the fruit of *Strychnos Nux-vomica* has been conclusively demonstrated by physiological experiment. The chemical examination of the pulp has shown that it contains, besides the alkaloids strychnine and brucine, a new glucoside which we have called loganin.

The glucoside loganin has been shown to exist in small quantity in the seeds.

The alkaloidal content of the seeds of *Strychnos Nux-vomica* is directly as their size and inversely as their number in the fruit.

The seeds obtained from the *Strychnos Nux-vomica* indigenous to Ceylon are especially noteworthy for their extremely high alkaloidal content. Every specimen examined has contained much more alkaloid than we have previously shown to exist in the richest specimen of nux-vomica seed that enters the English market—"Bombay" (3·90 per cent.). One specimen of the seed (from No. 3 fruit) yielded a very much larger quantity of alkaloid than has ever been supposed to exist in the seeds of this plant (5·34 per cent.). This is a matter of great importance from a commercial standpoint, for the plant is very abundant in Ceylon, and at present none of the seeds are exported from the island.

This communication bears witness to our great indebtedness to Dr. Ondaatje; but for his notes, drawings, specimens and his unwearied interest in the work, the results described in this paper could never have been reached. Dr. Ondaatje's drawings are of the greatest value not only on account of their high artistic merit, but also for the great accuracy with which the botanical characters are depicted. The illustrations to this paper are probably the most faithful reproductions of the nux-vomica plant that have yet appeared.

Analyses of Large and Small Seeds from same Fruit.

Seeds.	Percentage of Strychnia.	Percentage of Brucia.	Percentage of Total Alkaloid.
Largest seeds from No. 1 fruit . . .	1·80	3·50	5·28
Smallest seeds from No. 1 fruit . . .	1·80	2·61	4·41

Chemical and Botanical Analysis of the Seeds of Strychnos Nux-vomica indigenous to Ceylon.

Size of Fruit.	Weight of Fruit.	Diameter of Fruit.	Number of Seeds in each Fruit.	Weight of Seeds.	Diameter.	Thickness.	Circumference.	Nature of Edge.	Texture.	Form.	Interior.	Percentage of Strychnine.	Percentage of Brucine.	Percentage of Total Alkaloid.
No. 1	About 140 gms.	52 mm.	2—9, usually 4.	Large seeds, 2—2·5 gm. Small seeds, 1—1·5 gm.	13—25 mm., average 22.	3—5 mm., average 4½.	40—75 mm., average 66.	Nearly all rounded.	Silky.	Mostly circular, flat and concavo-convex.	Cotyledons 5-veined, albumen slightly resinous.	1·52	2·95	4·47
No. 2	About 78 gms.	35 mm.	2—3—4, usually 2.		15—24 mm., average 22.	3—5½ mm., average 4—4½.	45—72 mm., average 66.	Rounded with few acute.	Silky.	Circular, mostly concavo-convex, some flat.	Cotyledons 5-veined, albumen slightly resinous.	1·78	3·16	4·94
No. 3	About 12 gms.	29·5 mm.	1, rarely 2.		15—23 mm., average 21.	3—5½ mm., average 4½.	45—70 mm., average 63.	Rounded with very few acute.	Silky.	Circular concavo-convex, with some flat.	Cotyledons 5-veined, albumen slightly resinous.	1·71	3·63	5·34
No. 4	About 4 gms.	25 mm.	Usually 1 good or 2 abortive.		8—22 mm., average 17—20.	2—5 mm., average 4.	24—67 mm., average 58.	Nearly all rounded.	Rather silky.	Mostly circular, irregular.	Cotyledons 5-veined, albumen slightly resinous.	1·68	2·86	4·54

The Pharmaceutical Journal.

SATURDAY, JULY 5, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelops indorsed "Pharm. Journ."*

THE RESIGNATION OF MR. BREMRIDGE.

WHEN it became generally known, a month since, that a letter had been addressed to the President of the Pharmaceutical Society by Mr. ELIAS BREMRIDGE, in which he asked to be relieved from the active duties of the offices of Secretary and Registrar that he had for so long a time filled, there was a general desire manifested that the Council might see its way to respond to his request in a manner that should at the same time afford to him the desired relaxation and denote the high appreciation in which the service he has rendered the Society is held. The Committee to which the subject was referred would appear to have suggested a plan by which the double object can be attained, and at the meeting of the Council on Wednesday last its recommendations were presented and unanimously adopted. For the second time in twenty-eight years Mr. BREMRIDGE was prevented on that day through indisposition from occupying his usual post; but we venture to think that the chorus of testimony from the entire Council as to the earnest and enthusiastic manner in which he has served the Society, and of good wishes following him into his retirement, uttered in his absence, will be considered by him to be not the least gratifying portion of his solatium. Nor do we think that any of the kind words that were uttered on Wednesday were tinged with exaggeration. Fortunately, we believe, for the Pharmaceutical Society its history has been very strongly influenced by comparatively a few men with very decided views as to the directions in which it could most beneficially affect the interests of the pharmacists of Great Britain, and among these one of the most influential has been Mr. ELIAS BREMRIDGE. His secretarial work has never been a mere perfunctory performance of official duties, but has always been vivified by a strong personal interest in what he had to do. Whether engaged in trying to influence Parliament in respect to some legislative measure, or in conducting the ordinary business at Bloomsbury Square, or in pushing the claims of the Benevolent Fund which owes so much to his energy, Mr. BREMRIDGE has never laid himself open to the suspicion of indifference or half-heartedness. Indefatigable in labour, distinct in his conception of duty, tenacious of purpose, equally courteous to his superior officers and to all the members of the Society; to a broken-down pharmacist seeking relief, or even to an offender against the Pharmacy Act confessing his fault, Mr. BREMRIDGE has approached as nearly to the ideal Secretary as can be readily conceived. It is not surprising, therefore, that upon leaving his post he has so many friends to speak well of him, and amongst those who will think of him with the kindliest feelings will be men who for years have been brought into daily contact with him as fellow-servants of the Pharmaceutical Society.

THE BRITISH PHARMACEUTICAL CONFERENCE.

ONCE again in its history the British Pharmaceutical Conference does not meet at the same place as the British Association. No doubt our readers are aware that the meeting of the latter organization takes place in Montreal this year, and as it was not considered desirable that the Conference should follow it thither, an invitation to visit Hastings was accepted at the last general meeting of the Conference. It is now announced that the meeting will be held in the Assembly Rooms, Castle Hotel, Hastings, under the presidency of Mr. J. WILLIAMS, F.I.C., F.C.S. The general business of the Conference will commence on Tuesday August 12, at 10.30 a.m. After the reception of delegates from other societies and associations, and the reading of the report of the Executive Committee and the financial statement, the President will deliver an address. The reading and discussion of papers on pharmaceutical subjects will follow and will be continued during Wednesday the 13th. We understand that several papers have already been promised, the titles of which we hope to be able to publish shortly.

Apart from the advancement of scientific pharmacy, the Conference has for its object the promotion of friendly intercourse among pharmacists, and its meetings afford a most pleasant relaxation to a class needing it, perhaps, more than any other. We are, therefore, very pleased to refer to the attractions Hastings and St. Leonards offer and to the arrangements which have been made by the Local Committee for the entertainment of visiting members. Hastings itself is a place of great antiquity, but St. Leonards is really a modern outgrowth of the old town, and the contrast between the two is very striking. Old Hastings with its narrow streets nestling in a deep valley, and with its fishing boats and curious wooden net houses on the beach, is very picturesque, while St. Leonards and modern Hastings with their fine shops and houses stretching along the sea front far to the west afford a typical picture of the prosperous modern watering place. The Promenade and the Pier, the Baths and the Park are the principal attractions which the town itself possesses. The Pier has a fine pavilion at its further end in which concerts are given daily. The sea never recedes far from

the Promenade, and even at dead low water does not, as at some watering places, leave a dreary expanse of sand or mud beyond which the sea may be dimly discerned. For those who can spend some time in Hastings beyond that occupied by the Conference Meetings, the immediate neighbourhood offers many points of interest. The ruins of the Castle on the West Hill are worth a visit, as are some very curious and extensive caves at the north-east corner of the hill behind the lighthouse. To the east of the town is the East Hill, from which probably the finest view on the south coast of town, land and sea may be obtained. The cliffs here are more than three hundred feet high, and at high water go sheer down to the sea. Still further to the east and within walking distance from the town, the cliffs are interrupted by the two beautiful wooded glens of Ecclesbourne and Fairlight. The country inland abounds in pleasant walks and drives, and the botanist and geologist could find ample employment for their energies.

With regard to the local arrangements, the Castle Hotel has been fixed upon as the "headquarters" of the Conference, and it is proposed that on Wednesday evening a dinner be held there. On Thursday the local committee has arranged an excursion which will include a visit to Battle and its Abbey, and an inspection of the sub-Wealden or Gypsum works. On leaving these, Normanhurst, the seat of Sir Thomas Brassey, will be visited, and afterwards Ashburnham, the seat of the Earl of Ashburnham. It is hardly necessary to say that Hastings is easily accessible from London. From London Bridge, Victoria, Cannon Street or Charing Cross it can be reached in about two hours, and as the south coast has not been visited since the Brighton meeting in 1872 it is fully expected that the gathering this year will be a full one. We may remind our readers that on this occasion the resolution passed recently by the Executive Committee with regard to cost of entertainment comes into force. It had long been felt that the increasing cost of entertaining visiting members was becoming a serious burden, not only to local pharmacists but to others living a considerable distance away, who might be called upon for aid. In fact, great numerical success of the meetings would, under the old conditions, be soon fatal to the Conference. Under the new arrangements the Local Committee cannot spend any considerable amount upon the entertainment of the visitors, and we frankly give our opinion that this fact would cause invitations to the Conference to come much more readily from other towns if at any time it should be decided that the Conference should give up the practice of meeting at the same time and place as the British Association. Gentlemen who intend to be present at the Conference and who require any information as to hotel or other accommodation should apply at once to Mr. F. Rossiter, 20, George Street, Hastings, who will be glad to reply to any inquiries.

As was anticipated, the Medical Acts Amendment Bill was read a second time without further opposition and the Committee stage was set down for Monday, though there seemed little probability that it would be reached, as Mr. Bruce's notice for a vote of censure on the Government had precedence. The unexpected collapse of that motion, however, cleared the way, and notwithstanding certain protests against proceeding under the circumstances, upon Mr. Mundella undertaking that at least a week should elapse before proceeding further, the House went into Committee on the Bill, but at once resumed. Fortunately, steps had meanwhile been taken in respect to bringing before Parliament the amendment desired by pharmacists, and already forms of petitions had been forwarded to the gentlemen who had undertaken to look after the signatures in their respective districts. We have reason to believe that the efforts of these gentlemen have been very successful, and that a large number of signatures have been already obtained not only from chemists and druggists but from medical men. It remains now only to urge that each petition when completed may be sent without delay to the local member of Parliament for presentation, accompanied by a letter calling attention to the prayer of the petition and asking the member to support it by his influence. We understand that, following a sugestion made by Mr. Urwick at the Annual Meeting, in some instances personal interviews have been obtained with the members, and this course might be followed with advantage whenever possible. Especially has this been the case in Westminster, where a large deputation, consisting of most of the principal chemists in the district, waited on the Right Hon. W. H. Smith, who, after the various points involved had been laid before him, promised to give the subject his personal attention. We may mention that Mr. Sclater-Booth has given notice of his intention to move an amendment in the sense of the Society's memorial. At present the Bill is set down for further consideration on Monday next.

* * *

During the coming week the Annual Meeting of the Society of Chemical Industry will be held at Newcastle-on-Tyne, in the Lecture Theatre of the Literary and Philosophical Society, Westgate Road, under the presidency of Mr. Walter Weldon. The meeting will open on Wednesday morning, at 11 o'clock, when the Report will be presented and after the other usual routine business, the President will deliver an address. In the evening of the same day there is to be a Dinner in the Banqueting Hall, at Jesmond Dene, by the kind permission of Sir W. G. Armstrong, and on Thursday evening there is to be a Conversazione. The afternoon of Wednesday, as well as Thursday and Friday, will be devoted to visiting various industrial establishments in Newcastle and its vicinity.

* * *

From the official report of the proceedings at the May meeting of the Société de Pharmacie, which has just been published, it would appear that the resolution to send the MS. of the Society's scheme for an International Pharmacopœia direct to the next Congress at Brussels, to which we referred recently, has been modified, and it has been decided that the MS. shall be forwarded to the International Pharmacopœia Commission appointed in 1881 with a view to the Commission bringing it under the notice of the Congress. M. Petit, who is a Vice-

President of the Commission, was therefore authorized to take charge of the MS. for that purpose.

* * *

We notice that the Prize Committee of the Edinburgh Chemists' Assistants and Apprentices' Association has issued a statement as to the prizes that will be offered for competition among the apprentice members of the Association in the session 1884–85. The "Association Prizes" are three in number,—the first being a free ticket admitting to classes on chemistry, theoretical or practical, during an entire session,—to be awarded on the results of a competitive written examination in Latin, English, Arithmetic, Elementary Chemistry and Pharmacy. The Ainslie Pharmacy Prize, of the value of 21*s.*, is awarded annually to the apprentice member who shows the best knowledge of Pharmacy, and this year it is supplemented by a second prize of 10*s.* 6*d.* These competitions were instituted in connection with the Association two years ago, and it is stated that the papers submitted by the candidates hitherto have been extremely good. We understand that an annual prize has always been a feature of the Association, the prize being awarded in its earlier years for the best essay on a specific subject. At first there was a fair number of competitors, but ultimately only a single essay was sent in. The examination scheme was then substituted, and under it the number of candidates increases. These facts indicate that the scheme is itself good, while it evidently serves to extend the influence of the Association, the membership having increased to nearly three times the number since it was inaugurated.

* * *

Mr. Hosie, reporting recently on the exports from Ch'ung K'ing, which comprise the products of Tibet, Se-chuan and Yunnan, refers especially to rhubarb, which is produced in country lying between the provincial capital and the Tibetan border. He states that the annual export to other countries has dwindled for the last few years to about four hundred boxes, each weighing a picul (1 cwt. 21¾ lbs.), the total value being estimated at twelve thousand taels (£3500). This represents the rhubarb specially packed for the foreign market; but there is about an equal quantity sent out intended for use in the Chinese Empire itself.

* * *

Commenting upon the desirability that a closer examination should be made of the innumerable articles of the Chinese materia medica, Mr. Consul Alabaster, in a recent report, says that among them are many valuable drugs, with which the Chinese have been for ages acquainted, but which have only recently come into use in other lands, and he specially mentions salicin and euonymin! Probably he is on firmer ground when he supposes that such an investigation would reveal useful drugs with which Europeans are not yet acquainted, and suggests that the celebrated "pulurhcha," used by the Chinese as a digestive at the close of their heavy feasts, might turn out worthy of being better known.

* * *

A correspondent sends a warning against the operations of a swindler, who presents a prescription with the request that the medicine when made up may be sent to a certain address, with instructions to the messenger to wait for the money, and then apparently as an afterthought asks for some other article that he offers to take with him. Of course when the messenger arrives at the address given nothing is known there of the affair.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, July 2, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Andrews, Borland, Bottle, Gostling, Greenish, Hills, Radley, Richardson, Robbins, Savage, Schacht, Squire, Symes, Williams and Woodley.

The minutes of the last meeting were read and confirmed.

The PRESIDENT stated that he had received a letter from Mr. Elias Bremridge, who, he regretted to say, was suffering from an attack of rheumatism, and unable to attend.

MR. HAMPSON.

The PRESIDENT said he was very happy to announce that the Secretary had received a letter from Mr. Hampson, dated June 27, in which he stated that after the expression of the feelings of the Council which had been communicated to him, and after having taken time to consider, he begged most cordially to thank his colleagues for their very kind expressions, and under the influence of their kindness and pressure from other friends his resolution to retire, which he had thought was immovable, had for the time melted away. He would, therefore, withdraw his resignation, and should be glad to serve on the same Committees as last year.

On the motion of the PRESIDENT, Mr. Hampson's name was added to the Library, Museum, Laboratory and House Committee and the Law and Parliamentary Committee.

APPOINTMENT OF AN EXAMINER.

A letter from the Privy Council was read approving the appointment of Mr. W. H. Symons, 12, Queen's Terrace, St. John's Wood, London, as an Examiner.

DIPLOMAS.

The following, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Blain, Alfred Lucas.
Burnett, Joseph Fearon.
Prothero, George Rees.
Steward, Josiah William.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Blain, Alfred Lucas.....Bolton.
Burnett, Joseph Fearon .....London.
Clarke, James Thomas .....Altrincham.
Holmes, Francis .....Leeds.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Adams, Henry George .....Sudbury.
Holt, John.....Yarm.
Jones, Thomas .....Tregaron.

Modified.

Morris, Morris Davies.....Meifod

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Astley, Frederick Aspinall ...St. Anne's-on-the-Sea.
Barker, George.....Mirfield.
Barlow, Ernest Silas .....Oldham.
Britton, William Brannam.....Barnstaple.
Bunn, James Early Smee .....Halstead.
Burnby, John James .....Bardney.
Cullinan, Edward .....London.
Davies, Charles Gardiner .....London.
Earle, Ernest Haworth .....Hull.
Evans, John Richard .....Dowlais.
Johnston, William .....Montrose.
Jones, Llewellyn John Walter..Swansea.
Manson, William Mackenzie ...Edinburgh.
Saul, John Edward .....Rock Ferry.
Sloan, William Guley .....Barking.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Culverwell, Ebenezer .....Torquay.
Huggins, Samuel .....Barnet.
Humphreys, Henry.....London.
Law, James .....Insch.
Rutter, Clement Thomas .....Birmingham.
Spargo, Herbert .....Newcastle-on-Tyne.
Tudor, William Thomas .....Brecon.
Vassalli, Bartholomew Joseph..Leeds.
Ward, Albert Edward.....Bradford.

RESTORATIONS.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

APPOINTMENT OF PROFESSORS.

Professor REDWOOD was re-appointed Professor of Chemistry and Pharmacy for the ensuing year.

Professor BENTLEY was re-appointed Professor of Botany and Materia Medica for the ensuing year.

Professor ATTFIELD was re-appointed Professor of Practical Chemistry for the ensuing year.

EXAMINERS FOR COUNCIL PRIZES.

Messrs. CORDER and GALE were appointed to conduct the examination for the Council Examination Prizes during the present month.

LOCAL SECRETARIES.

The following list, which at the request of the Library, Laboratory, Museum and House Committee had been revised by the President and the Secretary, was submitted, and the persons named in the list were appointed Local Secretaries to the Society for the ensuing year:—

List of Local Secretaries, 1884–85.*

Towns eligible.	Names of persons appointed.
Aberdeen	Kay, James Petrie.
Abergele	Hannah, John.
Aberystwith	Wynne, Edwin Price.
Abingdon	Smith, William.
Accrington	Shackleton, Thomas.
Altrincham	Clarke, James Thomas.
Andover	Gould, Robert George.
Arbroath	Robertson, John.
Ashbourne	Reckless, Arthur Henry.
Ashton-under-Lyne	Fisher, Edwin.
Aylesbury	Turner, John.
Ayr	McGregor, Adam.
Banbury	Ball, George Vincent.
Banff	Ellis, Bartlett.
Bangor	Roberts, Meshach.
Barnsley	Badger, Alfred.
Barnstaple	Goss, Samuel.
Barrow-in-Furness	Steel, Thomas.
Bath	Commans, Robert Dyer.
Beaumaris	
Bedford	Taylor, James Bennett.
Belper	Calvert, James.
Berwick	Carr, Walter Paterson.
Beverley	Hobson, Charles.
Bewdley	
Bilston	Gray, Charles.
Birkenhead	Jones, Charles.
Birmingham	Southall, William.
Bishop Auckland	Dobinson, Thomas.
Blackburn	Farnworth, William.
Blandford	Griffith, Samuel.
Bodmin	Williams, Joel Drew.
Bolton	Dutton, Francis.
Boston	Pilley, Henry Thomas.
Bournemouth	Duncan, Alexander.
Bradford (Yorkshire)	Rimmington, Felix M.
Brecon	Meredith, John.
Bridgnorth	Deighton, Thomas Milner.
Bridgwater	Basker, John Anthony.
Bridlington	Jackson, Henry John.
Bridport	Beach, James.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Buckingham	
Burnley	Cowgill, Bryan H.
Burslem	Blackshaw, Thomas.
Bury	Bowker, Ellis.
Bury St. Edmunds	Summers, Frank.
Buxton	Wright, Robert.
Calne	
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Munday, John.
Cardigan	Jones, John Edward.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard Morgan.
Carnarvon	Lloyd, William.
Chatham	Crofts, Holmes C.
Chelmsford	Baker, Garrad.
Cheltenham	Barron, William.
Chester	Baxter, George.
Chesterfield	Windle, John T.
Chichester	Long, William Elliott.
Chippenham	Coles, John Coles.
Christchurch	Green, John.
Cirencester	Smith, Charles Septimus.
Clitheroe	
Cockermouth	Bowerbank, Joseph.
Colchester	Cordley, William Bains.
Congleton	Goode, Charles.
Coventry	Hinds, James.
Cricklade	
Croydon	Barritt, George.
Darlington	Robinson, James.
Deal	Green, John.
Denbigh	Edwards, William.
Derby	Goodall, Henry.
Devizes	Edwards, Thos. Roberts.
Devonport	Codd, Francis.
Dewsbury	Gloyne, C. G.

* Local Secretaries are appointed in all towns in Great Britain (except London and Edinburgh) which return a Member or Members to Parliament, and in such other towns as contain not less than three Members of the Society or Associates in Business.

Towns eligible.	Names of persons appointed.
Diss	Gostling, Thomas Preston.
Doncaster	Howorth, James.
Dorchester	Evans, Alfred John.
Dorking	Clift, Joseph.
Douglas	Brearey, William A.
Dover	Bottle, Alexander.
Droitwich	Sandiland, Robert B.
Dudley	Gare, Charles Hazard.
Dumfries	Allan, William.
Dundee	Hardie, James.
Dunfermline	Seath, Alexander.
Durham	Sarsfield, William.
Eastbourne	Crook, Herbert.
Elgin	Robertson, William.
Ely	Pate, Henry Thomas.
Evesham	Dingley, Richard Loxley.
Exeter	Broom, William W.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newman, Walter Francis.
Fareham	Batchelor, Charles.
Faversham	Lenfestey, William G.
Flint	Jones, Michael.
Folkestone	Goodliffe, George.
Forfar	Ranken, James A.
Frome	
Gainsborough	Spouncer, Henry Thomas.
Gateshead	
Glasgow	Kinninmont, Alexander.
Gloucester	Ward, Joseph.
Gosport	Hunter, John.
Grantham	Cox, John.
Gravesend	Bulgin, William.
Greenock	McNaught, Archibald.
Grimsby, Great	Cook, Robert, junior.
Guernsey	Arnold, Adolphus.
Guildford	Martin, Edward W
Haddington	Watt, James.
Halifax	Dyer, William.
Hanley	Eardley, James F.
Harrogate	Davis, R. Hayton.
Hartlepool	Jackson, William G.
Harwich	Bevan, Charles F.
Hastings and St. Leonards	Bell, James Alfred.
Haverfordwest	Saunders, David Price.
Hawick	Craig, John.
Helensburgh	Harvie, George.
Helston	Wakeham, Charles.
Hereford	Williams, Walter.
Hertford	Lines, George.
Hexham	Gibson, John Pattison.
Hitchin	Ransom, William.
Horsham	Williams, Philip.
Huddersfield	King, William.
Hull	Bell, Charles Bains.
Huntingdon	Provost, John Pullen
Huntly	Chalmers, George.
Hyde	Wild, Joseph.
Hythe	Lemmon, Robert Alce.
Ilfracombe	Wheeler, James.
Inverness	MacRitchie, David.
Ipswich	Anness, Samuel Richard.
Jersey	Ereaut, John, jun.
Kendal	Severs, Joseph.
Kidderminster	Gascoigne, Charles.
Kilmarnock	Borland, John.
King's Lynn	Palmer, William Joseph.
Kingston-on-Thames	Walmsley, Samuel.
Kirkcaldy	Storrar, David.
Knaresborough	Lawrence, William P.
Lancaster	Bagnall, Wm. Henry.
Launceston	White, Thomas.
Leamington	Davis, Henry.
Leeds	Reynolds, Richard.
Leek	Johnson, William.
Leicester	Clark, Walter Beales.
Leighton Buzzard	Readman, William.
Leith	Finlayson, Thomas.
Leominster	Davis, David Frederick.
Lewes	Martin, Thomas.
Lichfield	Perkins, John Jaquest.
Lincoln	Maltby, Joseph.
Liskeard	Young, Richard.
Liverpool	Symes, Charles.
Longton	Harrison, John.
Loughborough	Paget, John.
Louth	Hurst, John.
Lowestoft	Sale, Thomas J.
Ludlow	Woodhouse, George.
Lymington	Allen, Adam U.
Macclesfield	Bates, William Isaac.
Maidenhead	Walton, Ralph.
Maidstone	Rowcroft, Albert E.
Maldon	Wallworth, David.
Malmesbury	Brown, Francis James.
Malton	Buckle, James.
Malvern	Metcalfe, Edmund Henry.
Manchester, etc.	Wilkinson, William.
March	Davies, Peter Hughes.
Margate	Candler, Joseph Thomas.
Marlborough	
Marlow	
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Buck, Thomas.
Midhurst	Cowap, Samuel Evan.
Monmouth	
Montgomery	
Montrose	Burrell, George.
Morpeth	Marshall, George T.
Neath	Hibbert, Walter.
Newark	March, William.
Newbury	Hickman, Francis.
Newcastle-on-Tyne	Martin, Nicholas H.
Newcastle-under-Lyme	Cartwright, William.
Newport (I. of Wight)	Millidge, Alfred.
Newport (Mon.)	Phillips, John.
New Radnor	
Newtown	Morgan, David.
Northallerton	
Northampton	Bingley, John.
Norwich	Sutton, Francis.
Nottingham	Bolton, Charles A.
Nuneaton	Iliffe, George.
Oldham	Hargraves, H. Lister.
Oswestry	Evans, John.
Over Darwen	Shorrock, Ralph.
Oxford	Prior, George Thomas.
Paisley	
Pembroke	Treweeks, Rich. Harwood.
Penrith	Wilson, Joseph.
Penzance	Cornish, Henry Robert.
Perth	Donald, David.
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Hearder, Henry P.
Pontefract	Bratley, William.
Poole	Penney, William.
Portsmouth, etc.	Childs, James L.
Preston	Barnes, Lawrence R.
Ramsgate	Morton, Henry.
Reading	Bradley, Charles.
Retford	Clater, Francis.
Rhyl	Foulkes, William H.
Richmond (Yorks)	Thompson, John Thomas.
Ripon	Parkin, Joseph Brooks.
Rochdale	Taylor, Edward.
Rochester	Barnaby, Henry.
Rugby	Chamberlain, Arthur G.
Ruthin	Rouw, Theodore J.
Ryde (Isle of Wight)	Pollard, Henry Hindes.

Towns eligible.	Names of persons appointed.
Rye	Waters, William Allen.
St. Albans	Ekins, Arthur Edward.
St. Andrews	Govan, Alexander.
St. Austell	Hern, William Henry.
St. Ives (Cornwall)	Young, Tonkin.
Salisbury	Atkins, William Ralph.
Sandwich	Baker, Frank.
Scarborough	Whitfield, John.
Seacombe	Walker, John Henry.
Selby	Cutting, Thomas John.
Shaftesbury	Barry, Frederic.
Sheffield	Ward, William.
Shields, South	Mays, Robert J. J.
Shoreham	Fenner, Edwin.
Shrewsbury	Cross, William Gowen.
Southampton	Dawson, Oliver R.
Southport	Ashton, William.
Spalding	Shadford, Major.
Stafford	Averill, John.
Stalybridge	Simpson, Allwood.
Stamford	March, Richard.
Stirling	Moore, William J.
Stockport	Kay, Samuel.
Stockton-on-Tees	Brayshay, Thomas.
Stoke-on-Trent	Adams, Frank.
Stourbridge	Bland, Thomas Frederick.
Stratford-on-Avon	Hawkes, Richard.
Stroud	Coley, Samuel James.
Sunderland	Harrison, John.
Swansea	Grose, Nicholas M.
Tamworth	Allkins, Thomas Boulton.
Taunton	Gregory, George Henry.
Tavistock	Gill, William.
Teignmouth	Cornelius, Joseph.
Tenby	Davies, Moses Prosser.
Tewkesbury	Allis, Francis.
Thirsk	Foggitt, John B.
Tiverton	Havill, Paul.
Torquay	Smith, Edward.
Totnes	Michelmore, Philip W.
Truro	Percy, Thomas Bickle.
Tunbridge Wells	Howard, Richard.
Tynemouth	Stobbs, Robert.
Uttoxeter	Johnson, John Borwell.
Ventnor	Weston, Charles.
Wakefield	Wice, Jonathan H.
Wallingford	Payne, Sidney.
Walsall	Bate, Joseph William.
Wareham	Randall, Thomas.
Warrington	Greenough, Hugh F.
Warwick	Pratt, Henry.
Watford	Chater, Edward Mitchell.
Wednesbury	Gittoes, Samuel James.
Westbury	Taylor, Stephen.
West Bromwich	Stamps, Frederic.
Weston-super-Mare	Gibbons, George.
Weymouth	Groves, Thomas Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wick	Miller, Kenneth.
Wigan	Phillips, Jonathan.
Wigton	
Wilton	
Winchester	Hunt, Richard.
Windsor	Russell, Charles J. L.
Wolverhampton	Brevitt, William Yates.
Woodbridge	Betts, John.
Woodstock	Griffits, J. A.
Worcester	Virgo, Charles.
Worthing	Cortis, Arthur Brownhill.
Wrexham	Edisbury, James Fisher.
Wycombe	Furmston, Samuel C.
Yarmouth, Great	Poll, William S.
Yeovil	Maggs, Frederick R.
York	Sowray, Joseph.

Preliminary Examination Centres.

The following list was laid on the table, and referred to the Library, Museum, Laboratory and House Committee to consider whether any rearrangement should be made:—

PRELIMINARY EXAMINATION.

List of Centres and Table of Attendances of Candidates at each Centre.

	1881. Jan., Apr., July, Oct.	1882. Jan., Apr., July, Oct.	1883. Jan., Apr., July, Oct.	1884. Jan.	1884. Apr.	Total number of attendances at each centre at 14 examinations.
ENGLAND AND WALES						
Birmingham	62	56	76	18	17	229
Brighton	11	16	18	4	4	53
Bristol	38	34	35	9	9	125
Cambridge	18	22	21	3	7	71
Canterbury	19	12	12	—	4	47
Cardiff	29	32	39	6	12	118
Carlisle	27	25	33	5	7	97
Carmarthen	33	41	47	9	13	143
Carnarvon	15	24	25	9	10	83
Cheltenham	6	8	11	3	—	28
Darlington	23	13	23	4	8	71
Exeter	25	32	51	6	8	122
Hull	23	29	32	4	12	100
Lancaster	14	26	24	5	6	75
Leeds	57	64	94	14	17	246
Lincoln	29	30	36	4	11	110
Liverpool	44	34	63	11	15	167
London	147	176	210	32	54	619
Manchester	76	102	104	26	24	332
Newcastle	31	38	31	7	9	116
Northampton	17	12	17	3	3	52
Norwich	23	28	32	2	7	92
Nottingham	37	33	51	6	12	139
Oxford	7	7	5	2	2	23
Peterborough	15	22	21	6	3	67
Sheffield	24	25	33	5	6	93
Shrewsbury	25	16	29	1	5	76
Southampton	27	29	30	5	4	95
Truro	20	23	19	4	2	68
Worcester	11	12	22	4	2	51
York	34	33	33	3	6	109
SCOTLAND.						
Aberdeen	43	52	42	7	14	158
Dundee	33	33	21	7	8	102
Edinburgh	88	74	92	19	26	299
Glasgow	39	36	78	21	17	191
Inverness	12	11	12	2	5	42
Douglas, I. of Man	—	3	6	—	3	12
Guernsey	3	6	10	—	1	20
Jersey	1	—	1	2	2	6

Superintendents of Written Examinations.

It was resolved that Superintendents be appointed at the same places as last year, and that the appointment be offered in the first place to the Local Secretaries at these centres, with the exception of London and Edinburgh.

Reports of Committees.

FINANCE.

The report and recommendations of this Committee were received and adopted, and sundry accounts ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 63) of a pharmaceutical

chemist and member from 1866 to 1878. Applicant has had six previous grants. (Devon.)

£10 to the widow (aged 44) of a former member of the Society and subscriber to the Fund. Applicant has had one previous grant. (Herefordshire.)

£10 to the widow (aged 63) of a registered chemist and druggist. Applicant has had four previous grants, and was a candidate for an annuity at the last election. (Surrey.)

£10 to the widow (aged 54) of a registered chemist and druggist. Has three children to support, and five others who earn something. Applicant has had one previous grant. (Norfolk.)

£10 to a registered chemist and druggist (aged 70) infirm health. Applicant has had two previous grants.

£5 to the widow (aged 42) of a registered chemist and druggist. (Lancashire.)

£10 to a registered chemist and druggist (aged 61); in business twenty-five years, but now in very infirm health and unable to do anything. (Lancashire.)

One application had been refused, the applicant being in receipt of parochial relief.

The letter from Mr. Baigent, reported last month. recommending an increase of the annuities in certain circumstances, had been considered. In reply to an inquiry from the Committee it had been reported by the Secretary that if the suggestion were adopted in the case of male annuitants only, the expenditure would be £125 per annum more than at present, whilst if female annuitants were included the excess would be £500 per annum. The Committee was of opinion that having regard to the numerous distressing applications for relief it was undesirable to increase the amount of annuities.

The VICE-PRESIDENT, in moving the adoption of the report, said Mr. Baigent's letter had been most fully and carefully considered, but the Committee was almost unanimous in the opinion that the suggestion could not be complied with. The view entertained was that it was better to give a larger number of annuities of a smaller amount than a smaller number of a larger amount; thus, supposing there were £350 a year to be distributed, it would be better to give ten pensions of £35 each than seven of £50. He then referred in detail to the case which had been rejected, and explained that it was the unwritten law of the Society that no assistance could be given to persons who were in receipt of parochial relief.

The Council went into committee to consider this particular case.

On resuming, the report and recommendations were received and adopted.

FREEHOLD INVESTMENTS.

The report of this Committee gave particulars of certain ground rents, the purchase of which had been agreed upon for £12,000. The Committee also recommended that the remainder of the funds standing to the credit of the Benevolent Fund should be invested in ground rents, and that the same be done with the general funds of the Society with the exception of about £5000.

The Council went into committee, and the PRESIDENT and VICE-PRESIDENT explained the nature of the purchase in full detail.

On resuming,

The PRESIDENT moved the adoption of the report and recommendations, which was seconded by the TREASURER, and carried unanimously.

GENERAL PURPOSES.

The report of this Committee included a letter from the Solicitor, stating the progress of cases that had been placed in his hands.

Richard Beaumont, 290, Kirkstall Road, Burley, Leeds, had paid a penalty of £5.

Several cases of infringement had been considered by the Committee, and in most cases prosecutions were recommended.

The PRESIDENT moved the adoption of the report, which was unanimously agreed to.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
May	Day	511	31	9	19
	Evening	192	17	3	9

Circulation of books.	No. of Entries. Town.	Country.	Total.
May	149	128	277

Carriage paid, £1 18*s.* 6½*d.*

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Attfield (J.), Water and Water Supplies, and Unfermented Beverages, 1884 (International Health Exhibition Handbook). From the AUTHOR.

Drugs and Medicines of North America, vol. 1, No. 1, with offer to continue. From Messrs. J. U. and C. G. LLOYD.

Geddes (P.), A Re-statement of the Cell Theory, 1883–4. From the AUTHOR.

Godeffroy (R.), Tabellen und Formulare für qualitative und quantitative Analysen, etc., [1884]. From the AUTHOR.

Méhu (C.), Sur la recherche de l'albuminose dans l'urine, 1884. From the AUTHOR.

Schmitt (E.), Du dosage des acides gras libres dans les huiles, 1884. From the AUTHOR.

Johannson (E.), Forensisch-chemische Untersuchungen über das Colocynthin und Elaterin, 1884.

Lenardson (R.), Chemische Untersuchungen der rothen Manaca, 1884.

Schneider (R.), Ueber das Schicksal des Caffeins und Theobromins im Thierkörper, etc., 1884.

Thielick (P.), Beiträge zum gerichtlich-chemischen Nachweise des Cinchonidin, 1884.

From Professor DRAGENDORFF.

The Committee also recommended the purchase of the undermentioned works:—

Codex medicamentarius, Pharmacopée française. One copy of the new issue.

Daniell (W. F.), Text-book of the Principles of Physics, 1884.

Martindale and Westcott, Extra Pharmacopœia, 3rd ed., 1884.

Workshop Receipts, third series, by C. G. W. Lock, 1884.

Curator's Report.

The Curator had reported the attendance in the Museum during May to have been:—

	Total.	Highest.	Lowest.	Average.
Morning	512	33	9	18
Evening	183	22	1	6

The following donations to the Museum had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Eighteen small specimens of rare drugs from the Dutch Indies. From Professor VAN EEDEN, Haarlem.

Specimens of pure and impure Phosphorus Pentachloride. From Mr. W. H. INCE.

Specimen of Bergaptene from oil of bergamot, crystallized from alcohol.

Specimen of Citroptene from commercial essence of lemon, crystallized from alcohol. From Mr. J. O. BRAITHWAITE.

Specimen of Menthol prepared from *Mentha piperita* in the United States. From Professor ATTFIELD.

The List of Local Secretaries had been considered and settled, subject to approval of Council.

Retirement of the Secretary.

The Committee had considered the letter from the Secretary desiring to resign his office, and recommended—

"1. That in consideration of the zeal and unceasing devotion with which for so many years Mr. Elias Bremridge has fulfilled the duties of his office, he be permitted to retire from the position of Secretary and Registrar on a pension of £400 per annum.

"2. That Mr. Richard Bremridge be appointed Secretary and Registrar at a salary of £450 per annum.

"3. These recommendations to take effect on their adoption by the Council."

The PRESIDENT said the most important matter in the Report of this Committee, the adoption of which he would move, had reference to the letter read at the last meeting of the Council from Mr. Elias Bremridge. Both the Society and the Council would understand that it was with somewhat mixed feelings that he rose to move the adoption of this report, which involved the loss of the valuable services of an officer who had been connected with the Society for so many years, and whose devotion and enthusiasm on many occasions had been observed by all who sat round that table. It was always possible to find certain men who could do certain work in a certain way, but it was not always possible to find men who were capable and willing to do the work who were at the same time enthusiastic in it, and who did it as though they loved it, and as though they looked on the remuneration given as practically a secondary consideration. He would venture to say, however, with regard to Mr. Elias Bremridge, that for many years that was the position he occupied with reference to the Society. For many years he practically did the whole of the work, whilst his remuneration was very scanty. It was as much as the then Council thought the Society could afford, but it was immeasurably less than such an officer deserved to receive, for, if there were anybody like the typical chemist and druggist who did the whole of the work with his own hands and head, it was Mr. Bremridge; he was in those days the Society's officer, clerk and general factotum. From his former experience, when a member of the Council, he could say that the length of time which Mr. Bremridge used to devote to the work of the Society, and the enthusiasm he threw into it, at the time of the passing of the Pharmacy Act in 1868, taxed his energies in a manner which he felt sure had, more or less, affected his health ever since. He had no doubt that the state of tension into which Mr. Bremridge's mind got during that memorable struggle, the fact of having to work with hardly any staff both night and day, and the state of excitement into which he worked himself, was such that when the Act was passed, and the object more or less accomplished, he was absolutely unstrung, and that defect of hearing and depression of spirits which had since befallen him, took its rise. Mr. Bremridge was in the habit of saying that he thought this occurred from a draught, but he (the President) did not think that was so. Mr. Bremridge was really paying the penalty for having discounted his strength. It was a pity that those who were then on the Council allowed him to do so. But it was the nature of the man, and it was scarcely possible for the Council in those days to suggest to him prudence in the use of his resources and strength. It was unnecessary to refer to the interest that Mr. Bremridge took in the Benevolent Fund; practically he had so completely identified himself with that Fund that it might be said to have been built up very much under his eye. Every member of the Society, as well as every member of the Council, would feel that that grand structure for distributing relief was very largely due to the efforts, year by year and month by month, of Mr. Bremridge to keep its interests before the members and the trade at large. Lastly, he might refer to the Juries Act, which exempted pharmaceutical chemists from jury service. That was one of the occasions on which the work had to be done under great pressure, and the practical success of the application to Parliament to exempt pharmaceutical chemists was due, if not entirely, very largely to the tact and judgment of the Secretary, his knowledge of the world and his watchful care. He desired, however, not so much to refer to special matters, but to say in general that the whole work of the Society and the care for its welfare were objects that were dear to Mr. Bremridge's heart, and the way in which he received every member of the Society and every visitor, the warmth with which he inquired after their domestic welfare, was so well known to every member of the Society that he was quite sure that they, like the Council, would regret that the time had come when he felt it necessary to sever his official connection with the Society. It would be cruel on his part or on the part of the Council to suggest that there should be anything like an emeritus position found for Mr. Bremridge. He conceived they were bound to be generous aud considerate to their friend; but the greatest generosity and consideration would be shown by gently, but firmly, telling him that he must now enjoy himself and recuperate his health to the best of his ability and not worry himself in the smallest degree with regard to the official work of the Society. He would be in a position to offer valuable advice, as past Presidents and Vice-Presidents were able to do, and it was desirable that he should hold the position of a confidential adviser, rather than be kept in harness for any longer time. He hoped the Council would accept the report of the Committee unanimously. The terms of the recommendations were equitable, and if anything were to be said about them it might be that they were not generous enough. He begged, therefore, to move that the report and recommendations be received and adopted.

The VICE-PRESIDENT said he felt it an honour to be permitted to second this motion. The Society lost that day the services of a very excellent and valued officer, and it was impossible to exaggerate the importance of the services he had rendered. He had not only been a very capable administrator, but he had thrown into his work an amount of enthusiasm and of heartiness which those who had known him personally could to some extent appreciate. He did not think the Council ought to allow Mr. Bremridge to retire without personally assuring him, as they could do, of their very great respect for his career. He might have wished in one sense that Mr. Bremridge could have been present on that last occasion; but from another point of view it was an advantage that he was not present, as the members of Council could say in his absence things that could not be well said to him personally. He was reminded that Mr. Bremridge had been absent from the Council only once during his long tenure of office, and it was a remarkable fact that during a period of nearly thirty years he had been enabled, and been so devoted to his work, as to be always present. On the one occasion when he was absent, his health had become so broken down by over-pressure that the Council unanimously voted him a month's leave. Mr. Bremridge's long term of office embraced a large proportion and an eventful portion of the Society's history, and during that time the Society had had from him not merely official service. Everyone knew that the permanent officials were of the greatest possible importance to institutions; governments and cabinets changed, but they were always willing to bear testimony to the importance of the services rendered by permanent officials, and there must always be a vast amount of responsibility thrown upon those who had to discharge such functions. He hoped that Mr. Bremridge in retiring into private life, would recover to a large extent that health which had been impaired in the service of the Society; he believed it was the right thing for him to do, and he trusted that the evening of his life might be gilded by pleasant reflections, as it certainly would be, and by an improved condition of health, which his comfortable surroundings would enable him to enjoy. With regard to the Benevo-

lent Fund, no one but those who had been applicants for that Fund could know how graciously, kindly, considerately and patiently he had considered the cases which were brought before him. It had come within his knowledge again and again, that instead of being received with cold officialism, which would have entertained a proposal submitted to it and nothing more, every case had been listened to with the greatest kindness and supported in committee with every possible consideration. All these were things which had made him a model Secretary. A great man once said he was the State, and in one sense, Mr. Bremridge might say he was the Pharmaceutical Society, and if Wren might say of the great Metropolitan Cathedral, "Si monumentum requiris, circumspice," Mr. Bremridge might point to the Pharmaceutical Society and say, This structure which in spite of all coldness and hostility is a source of great satisfaction to pharmacists throughout the country, was very largely the result of my patient, conscientious and untiring efforts.

Mr. SAVAGE could not allow this motion to pass without a few observations. As an old member of the Society he endorsed all that had been said, and the only thing he had at all regretted was that some duty in connection with the Society did not still devolve on Mr. Bremridge. From his long connection with the Society he feared that his separation from it would have a serious effect upon him; he could have wished that some office, perhaps in connection with the Benevolent Fund could have been fonnd for him, not only for his own sake, but on behalf of the Society. Mr. Bremridge had always taken a very prominent part in connection with the Benevolent Fund, and all present knew that he was on every occasion ready to call attention to any particular passage in a new Act of Parliament, or anything likely to effect the interest of the Society. He recollected very well the first appointment of Mr. Bremridge, and Mr. Brew, who was then a member of the Council, told him how singularly fortunate the Council was in getting such a man to supply the place of Mr. Smith.

Mr. WILLIAMS said he was sure all the members of the Council who had known Mr. Bremridge for any time would have the same feeling as he had,—a feeling of great regret at parting with him. His conduct had not been that of an ordinary servant; he had been something more—so much more that he feared they would not thoroughly appreciate what he had been until they missed him. He was glad, of course, that the Committee recommended that Mr. Richard Bremridge should be appointed in his place, and it must be great satisfaction to the father that it was so. He believed that the Society would secure in the son a most valuable servant and Secretary who would do his duty thoroughly. At the same time he was quite sure Mr. Bremridge would feel very severely the severance from active service. He had known him, not so long as Mr. Savage, but he had known him a long time. At first his feeling was not quite what it was now towards him, and he perhaps fancied that he exercised his office too severely; but he now knew how different the truth was, and that his duties were performed with the greatest consideration, even to those who broke the law, and whom the Council was forced to prosecute and punish. As for his conduct in connection with the Benevolent Fund, he was certain the Council would miss him very much, for there was no one who could replace him at the present moment in that particular department, and he was sorry that Mr. Bremridge could not retain some little voice in that matter. He had thought, when the subject was first broached, that the Council might have arranged that Mr. Bremridge should have retained some official position in connection with the Benevolent Fund; but on thinking the matter over he had come to the conclusion that half-measures were always objectionable, and to place him in a sort of semi-official position would be a mistake from every point of view. He therefore thought it would be better for all, however painful it might be be, that the severance should be complete. He was glad the Committee had seen its way to make what seemed a fair and satisfactory arrangement as to a retiring pension which after all would not be any burthen on the Society.

Mr. BOTTLE had much pleasure in supporting the motion. He felt that what had already been said left very little to say, and he could endorse nearly all that had been said; but he must take a little exception to one thing which fell from the President, which seemed to be a little reflection on the former members of the Council, about not restraining the zeal of Mr. Bremridge. As he was one of the members of the Council at that time, he could assure his colleagues that it was not in the power of the Council to restrain him, and they could only prevent him from working in the small hours of the morning, by expelling him from residence in that house. That was to him exceptionally painful for the time and had it not been for that energetic measure which was forced upon him, he did not believe that Mr. Bremridge would have been now alive. It had been his privilege to sit at that table during nearly the whole time Mr. Bremridge had been Secretary, and to watch the interest he had taken in his work, to watch how his work had extended, and to watch how the business of the Society had expanded, and he often felt that though the Council had certainly given Mr. Bremridge assistance from time to time, that assistance had been more pressed upon him than asked for, and that his remuneration had not progressed in proportion to his work. However, he hoped that Mr. Bremridge was now taking the right course, and that though he retired from official work the members would often have the privilege of seeing him within the walls of that house, or meeting him elsewhere, and that he might be spared to enjoy his retirement for many years to come.

Mr. ROBBINS, having worked with Mr. Bremridge for many years, could not help expressing his great regret at the loss the Society would experience on his retirement. It appeared to him it would cause a blank which he had not experienced before since he had taken an interest in that Society. Mr. Bremridge in all his official duties had been everything that could be desired, and as a friend he had been one of the warmest. He hoped that now he would be able to take some rest, his health would improve, and that the members of Council would enjoy his friendship and fellowship for many years to come.

Mr. RADLEY, having been acquainted officially as local Secretary for Sheffield with Mr. Bremridge from his first appointment, said it was a matter of considerable pain to him to think that that connection was to be broken. He had been very much impressed in former years with the extreme readiness and regularity with which Mr. Bremridge conducted the correspondence, and also with the excellent judgment he had always displayed, so that he had served the Society very much in guiding the thoughts and views of the local secretaries in various parts of the country. He not only appreciated Mr. Bremridge's mode of carrying on the work of the Society, but also the gentlemanly manner in which he conducted it, and the exceptionally kind and considerate way in which he dealt with various things connected with his office. Personally he had always received the greatest kindness and consideration at his hands, and he felt for him great sympathy on his retirement, and only regretted that he should lose the opportunity of seeing him so frequently.

Mr. WOOLLEY said his acquaintance with Mr. Bremridge was first formed when he came up to London as a student to attend the lectures there, and he should always remember the kindness with which he was received. A subsequent experience of Mr. Bremridge's character had led him to see that he always had the welfare of the Society deeply at heart, and he did not think it would be possible to find anybody who would carry on the affairs of the Society better than he had done. At the same time the Society was very fortunate in securing the services of his son, who had had the ad-

vantage of his father's instruction, and would carry on the work on the same lines. He did not think the Council need trouble about finding Mr. Bremridge any sphere of work, for no doubt whenever he felt so disposed he would pay a visit to Bloomsbury Square and give the officials the benefit of his valuable advice. In times past it was possible he might have differed from Mr. Bremridge on some questions which had arisen, but he could not now remember what they were, and he should be rather inclined to believe that the odds were in favour of his being wrong, and Mr. Bremridge being right. In the vast majority of cases, however, he had always been in unison with him. He was very glad to have this opportunity of recording his great respect and esteem for him, and he regretted that the time had arrived when Mr. Bremridge found it necessary to resign his position.

Mr. GREENISH said he fully concurred in all that had been said and he felt that he should be needlessly occupying time if he was to repeat it. As a past President of the Society however he could not but speak gratefully of his indebtedness to Mr. Bremridge during his term of office. If he ever came there, and wished to speak to him, he was always at his service ready to throw everything aside, and to listen, with his hand to his ear, to all that he had to say, and then with a fair amount of modesty would give his opinion. The presidency of that Society involved a great responsibility, which was very much lightened by the assistance which the Secretary afforded. He thought it would be a great mistake for him to retain any official position in connection with the Society, and he sincerely hoped that many years might be spared to him to enjoy that quiet rest from labour which his health so eminently needed and which he so richly deserved.

Mr. RICHARDSON, as a young member of the Council, wished to add his feeble tribute to the many virtues possessed by the late excellent Secretary. It might be remembered by some that when he was a very young member of the Council he had a little disagreeable passage at arms with Mr. Bremridge, but the kind way in which Mr. Bremridge treated him on that occasion endeared him so much to him afterwards that he had ever felt the greatest kindness towards him. The remarkable crisis of to-day put him in mind of an occurrence which took place at one of the public schools at Uppingham when the Tercentenary of that school was celebrated. The Bishop of Carlisle, in delivering an address, after speaking of the founder of the school, one Archdeacon Johnson, spoke of the present headmaster as the second founder of Uppingham School, and with all due respect to the memory of Jacob Bell as the founder of that Society, he thought that they might also say that Elias Bremridge had been in some measure a second founder. He remembered the breaking down of the former Secretary, Mr. Bremridge's accession to office, and the immense difficulty he had to contend with in those days from an insufficient staff; but notwithstanding all these difficulties Mr. Bremridge had built up that large educational establishment with complete success. He also had great pleasure in alluding to the genial character of Mr. Bremridge. He was always useful and kind to those who were his juniors, and showed a warmth to every member of the Council which they would never forget. They might hope that the mantle of so worthy a father would fall on the shoulders of his excellent son, and that he might long live to continue the same efficient service for the benefit of the Society.

Mr. SCHACHT said it was quite right that the Nestors of pharmacy should have expressed themselves in the first instance on this occasion, and he cordially approved of all that had fallen from them, especially as far as their testimony went as to the services which the Society had received at the hands of the late Secretary, but he had a feeling that it had all partaken of a somewhat sad and serious tone, which perhaps was natural; but it might be permitted to him as comparatively speaking a young man to slightly modify that tone, for he really thought the occasion was one for all-round congratulation. Mr. Bremridge was happily not in the position of being a used-up man at all; he was still in the enjoyment of a considerable portion of his powers, and he was delighted to think that the arrangements now suggested, which he had no doubt would be unanimously agreed to, would afford ample opportunity for the legitimate, comfortable, honest and honourable enjoyment of those powers, and he could not help thinking that from his point of view it was a fortunate position for a man to occupy. Mr. Bremridge had given a very considerable portion of his life to the service of an honourable and honoured institution, and he retired under the most fortunate circumstance, that he was able to see his son enter upon his own course. Of course it was not always easy for a man to know exactly when to retire in favour of the next generation, and still less easy to say when he should retire in his own son's favour, but he had just been helped by the judgment and good tact of the President in finding out the exact moment when his decision should be made, and that was a great point for congratulation. He had not the slightest doubt that their old friend found absolute content in his position; seeing he was at a time when he still had many opportunities for enjoyment, a comfortable supply of good things for himself, and a happy prospect for his son. As for the members of Council, unless they had seen their way to make a wise arrangement for the future, they would not have been happy; but they had been fortunate to rear, under the eye of his father, a most worthy successor, and if Elijah's mantle were to fall on Elisha in this case they would not only have every reason to be content, but they might be more than content. Consequently they might fairly be congratulated on the fact of having the interests of the Society carefully considered for the future, and without any additional expense to the Society, whose funds they had to administer. Admitting, therefore, the force of the natural regret which must be felt at parting with an old officer, there was still great satisfaction, looking all round, that it was the right thing to do, and being able to say cheerfully, "Well done, good and faithful servant."

Mr. GOSTLING said it was unnecessary to add to the testimony which had been borne all round the table to the great efficiency of their late Secretary, but he might be allowed to endorse most emphatically all that had been said with reference to that gentleman's attention and devotedness to the work of the Society, for he felt that all that had been said respecting him was thoroughly merited. He was also extremely gratified at the arrangement for the future. It must be a great source of gratification to Mr. Bremridge to see his son so highly respected by every member of the Council. He did not know what pleasure a man could have greater than to see his son walking after him, exactly in the steps he himself had so worthily trodden, which had borne such great honour to himself and to all who had been connected with him. He felt the Society had been exceedingly happy in having possessed such an excellent Secretary and Registrar, and although he had only been a member of the Council a few years, on every occasion he had seen Mr. Bremridge's work he had been convinced of the thoroughness and perfect manner in which he had discharged every duty. No question was ever asked but that he was able to reply to it, and to put his finger on anything which had occurred during the whole history of the Society, so that not only the young but the older members of the Council had been greatly assisted by his great facility of reference to everything which had occurred. The Society had lost a very excellent officer, but he congratulated him on the circumstances of his retirement, on the appreciation of his work, and also on the succession of his son to office.

Mr. HILLS said he could not allow Mr. Schacht to

speak entirely for the young men, he should like to endorse in one word all that had been said with regard to Mr. Bremridge's good qualities. He could only think of him as a part of the Society, for ever since he had known anything about it, Mr. Bremridge had been Secretary, and to a great extent had embodied the Society. He had not had the privilege some members had of being in momentary antagonism with him, for he thought as a rule his views, so far as they had been formed, were perfectly concordant with Mr. Bremridge's. But he could speak of Mr. Bremridge as having been a very kind and genial friend to him whilst a student, and also since he had had the honour of a seat at that Board. He fully concurred also in what had been said with regard to Mr. Richard Bremridge, in whom he had no doubt they would find a very able and efficient successor.

Mr. BORLAND said he believed he was the youngest member of the Council, but he could assure his colleagues that, from the first day to the present, he had never had any opportunity to form an opinion with regard to the work of their worthy Secretary different from any of the expressions which had fallen from any member of the Council. He had always found him to be courteous, affable and willing to give any information in his power. With regard to the work of the Society in Scotland, he could say, from his own personal experience, that Mr. Bremridge's correspondence with the members of the Board of Examiners there had always been of the most gentlemanly character. He was free to admit that sometimes they might have considered the correspondence a little too punctilious and formal; but it must be admitted that whatever was done in that way, there shone through it on its very face a strong desire to conduct the business in strict accordance with the bye laws of the institution, so that on the whole there was not one single fault to find. He might refer to a fact with which they were all conversant, that they were indebted to Mr. Bremridge for a very excellent draft of improvements which they would all like to have seen carried out in the amended Pharmacy Bill. He believed it was entirely owing to his thorough experience of the past history of the Society, and to his strong desire to see pharmacy placed on a proper footing, that he had prepared this draft. It might not be carried out in his time, but still the Council was much indebted to him for it and he was sure all the members must feel satisfaction that they were able to place him in a position which would enable him to enjoy his retirement with satisfaction and pleasure to himself.

The VICE-PRESIDENT said he felt it was an omission he had made in speaking before not to refer to Mr. Richard Bremridge, and he should like to say how entirely he agreed with the kindly hopes expressed with regard to him, and his thorough conviction that the Council had secured a most able and efficient officer.

The PRESIDENT, in putting the motion, said no doubt the Council and the members at large from their knowledge of Mr. Richard Bremridge would feel that it was the greatest possible convenience that they had an officer trained in the Society who could fill a position of that sort. However, he would not say anything more on this point at present except to express a hope that Mr. Richard Bremridge might after thirty years' more service merit the encomiums which had been passed on his father.

The resolution having been passed, Mr. Richard Bremridge was called into the room, and the PRESIDENT, in addressing him, said he had the gratification and privilege to express to him on the part of the Council the fact that he had been unanimously appointed Secretary and Registrar of the Society. In appointing him the Council felt that it might trust to receiving from him some measure of the service which had been rendered by his father, and that he would not be an unworthy successor.

MEDICAL ACTS AMENDMENT BILL.

The PRESIDENT said he had to report the state of matters with reference to this Bill. The second reading in the Commons had been postponed from time to time, but as soon as it became within a measurable distance of being read it was necessary for them to put themselves in communication with Mr. Mundella, who had charge of the Bill in the House of Commons. The first thing it seemed to him and his advisers proper to do was to get a notice of an amendment put upon the paper, and, accordingly, he got Mr. Sclater-Booth to undertake to give notice of the amendment which the Council agreed to last year, and that notice had been given. He had also seen Mr. Mundella, and had a friendly chat with him without any formal appointment. He was perfectly frank and business-like and expressed his desire as far as he could to meet the wishes of the Society, but, of course, he said his difficulty was that according to the information he had received, the Medical Council was against the amendment. Mr. Mundella listened to his statement and admitted that, as far as he could follow him, there was something to be said, and his advice generally was that the Society should use its efforts with members of the House of Commons who took an interest in such matters, so that he might see what sort of support the amendment would receive; but at present under official advice it was impossible for him to say that he could amend the clauses, more particularly, as had been observed by the Lord President of the Council, as the clauses in this Bill did not differ from those of the Act of 1858. He had accordingly, as instructed last year by the Parliamentary Committee, taken practical steps, and had drafted a circular to be sent to members of Parliament, in which a copy of the memorial to the Privy Council was enclosed, and also extracts from the report and discussion at the International Pharmaceutical Congress, in which the whole subject was treated in a very fair way. This had been sent from the office to every member of Parliament, and copies could be obtained by any members of the Council; petitions also had been drafted and sent to all the local secretaries. In conclusion, he moved that a petition from the President and Council of the Society be sent to the House of Commons praying that an amendment be made to the Medical Acts Amendment Bill, providing that the Pharmacopœia Committee should include pharmacists, and that the seal of the Society be affixed to that petition.

Mr. GREENISH seconded the motion.

Mr. ANDREWS asked when would be the best time to send in petitions.

The PRESIDENT said as soon as possible. The Bill was down for next Monday; possibly, however, it might not be reached till a few days later. There was no doubt every effort would be made to pass the Bill this session, as it had gone through all the stages in the Lords.

Mr. GREENISH said that from an investigation which he undertook long before the International Congress met, he found there was no civilized country, except England, where pharmacists had not a voice in the preparation of the Pharmacopœia. It seemed evident that in addition to a large amount of indifference, there was really a lot of opposition to encounter, and it was quite as well to understand that.

The motion was then put and carried unanimously.

The PRESIDENT said he had received a letter from the Secretary of the Pharmaceutical Society of Ireland thanking the Council for the liberal terms on which it had agreed to supply copies of the Journal to members of the Society in Ireland.

PHARMACEUTICAL CONFERENCE.

The President, Vice-President, Messrs. Bottle, Borland, Greenish, Hills, Radley and Schacht were appointed delegates to the meeting of the British Pharmaceutical Conference, to be held in August, with any other member of the Council that may be present.

REPORT OF EXAMINATIONS.

June, 1884.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (18th)	7	4	3
Minor (18th)	25	8	17
„ (19th)	29	8	21
	—54	—16	—38
	61	20	41

Preliminary Examination.

Five certificates received in lieu of the Society's Preliminary examination.

2 College of Preceptors.
2 University of Cambridge.
1 „ „ Oxford.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, June 26, Mr. H. G. Greenish, Vice-President, in the chair.

The Reporter on Inorganic Chemistry, Mr. A. J. G. Lowe, read a "Further Report on the Purification of Crude Sulphide of Antimony."

A discussion ensued, in which the Chairman, Secretary, Dr. Senier and Mr. Cullinan took part.

A paper was then read on "Eykman's Process for the Estimation of Ethyl Nitrite," by Mr. T. S. Dymond, which was illustrated by experiments.

The paper gave rise to a discussion, in which the Chairman, Secretary, Dr. Senier, Messrs. Allen, Lowe and Short took part.

The Reporter on Physics. Mr. H. Allen, B.Sc., then made a Report on "A Modification of Holtz's Electrical Machine."

The report was experimentally illustrated with very successful results.

The meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At the first meeting of the newly-chosen Council of this Association, held on June 4, the following officers for the ensuing session were elected:—President, Mr. R. Winfrey; Vice-Presidents, Messrs. J. O. Braithwaite and H. H. Millhouse; Treasurer, Mr. W. Ralph Dodd; Librarian, Mr. H. Cracknell; Secretaries, Messrs. J. F. Burnett and Edward Baily.

It was resolved to renew the subscription to Messrs. Mudie's Library, so that members might obtain books from this source, through the Hon. Librarian, as heretofore.

The Association, being about to leave their present rooms in Conduit Street, a Committee was appointed to advertise for other rooms, and to report upon such as met with their approval.

At a subsequent Council meeting it was decided, upon the report of the Committee, to accept the offer of rooms at 103, Great Russell Street, W.C. The meetings of the Association will therefore be held, after October 1, 1884, at this address, whither all letters may in the meantime, be sent.

INTERNATIONAL HEALTH EXHIBITION.

CONFERENCE ON SANITARY LEGISLATION.

A Conference on this subject, convened by the Social Science Association, was held on Thursday, June 26, at the Conference room of the Health Exhibition, Sir Richard Temple, G.C.S.I., in the chair.

The proceedings commenced with an introductory address by Mr. Francis S. Powell, in which he reviewed the past legislation on sanitary matters, omitting London, whose wants are special and complicated, and which is in arrear instead of being in advance of the country generally. The desirability of codification and of bringing into one general Act various provisions which are only found in certain local Acts was also pointed out, and some of the directions in which further powers are required, such as the notification of infectious diseases, were also referred to.

Mr. H. H. Collins, F.R.I.B.A., read the next paper on "What Conditions are essential for a Healthy Dwelling and how far is it desirable that they should be rendered compulsory by Legislation?" The first part of the subject might be summed up in one word, *cleanliness*, applied not only to air and water, but to the ground upon which a house was built, for the foundations had been proved to have an important influence on the air and water which came in contact with them. Subsoil drainage, a pure and constant water supply and abundance of air around the dwellings were dwelt upon as the main points to be attended to. With regard to the latter half of the subject, the author was of opinion that there is already sufficient legislative enactment, the one thing to avoid being over-legislation and the thing to aim at improvement in administration, including uniformity both in action and area, and especially the abolition of the distinction between urban and rural districts.

A discussion ensued in the course of which Mr. Powell and Mr. Bourne, steward to the Duke of Bedford, emphasized the evils resulting from enormously high buildings, the latter gentleman recommending the removal of factories to the suburbs or outskirts.

Mr. Debenham referred to the evils arising, on the other hand, from small houses built on marshy land, and Mr. Stanley Bird gave a remarkable instance lately found near the centre of London, in getting out foundations for a new building, of two different sets of cesspools, one several feet below the other.

Mr. Arnold, as a member of a country sanitary authority, referred to the difficulty experienced from the want of urban powers in controlling new buildings, and Mr. Craig narrated some of his experiences at Ralahine, fifty years ago.

Dr. J. H. Bridges then read a paper entitled "What, if any, Restrictions in the Interests of Health should be enforced in connection with the Employment of Girls and Women in Workshops and Factories?" After a brief, but very careful sketch of existing legislation on this subject, Dr. Bridges proceeded to consider what further powers were required and recommended that the employment of women for six weeks after child-birth, should be prohibited. The extension of the Workshops Acts to domestic industries, he did not think would be practicable, the machinery of inspection being already applied as far as was safe, possible or expedient, and, therefore, the remedy for the undoubted evils must, he thought, be sought in other directions. He would abolish the distinction between factories and workshops as far as regards sanitary inspection and the subjection of the former to the health authority of the district. The direction in which he looked for a removal of the evils connected with the condition of women in workshops, and following home occupations, were first, an extension, of Women's Unions, and secondly, an improved state of public opinion, leading everyone to refrain from purchasing articles for which there was reason to believe the maker had not been fairly paid.

Mr. Arnold spoke of the hardships suffered by young women employed in drapers and milliners' shops, especially in poor neighbourhoods, where they were often employed in an unhealthy atmosphere, from half-past eight in the morning until after twelve at night.

Mr. Edwin Chadwick, C.B., thought it desirable that factory inspectors should be medical men, as they would thus be able to detect and check the first outbreak of infectious disease.

After a few words from Professor de Chaumont,

Miss Bewicke said she hoped no legislation would be attempted with regard to female labour, without the opinion of the women themselves being taken in some such way as was suggested in Dr. Bridges's paper.

The Conference then adjourned.

At the conclusion of the Conference, a lecture on "Ambulance Organization in War and Peace," was delivered by Surgeon-Major G. J. H. Evatt, M.D., A.M.D., the chair being occupied by Sir W. MacCormac, F.R.C.S.

The lecturer commenced by giving an interesting description of the army hospital arrangements, explaining in detail the constitution of the field ambulance corps and their distribution in an army corps. He laid great stress upon the absence of sufficient assistants to enable surgeons properly to do their work, and said that nothing but public opinion could obtain the requisite means for medical officers attending properly to the wounded in the field. He urged the importance of similar organizations being formed in connection with the Volunteer movement, and that it should be supported by Government in the form of capitation grants. The remainder of the lecture was devoted to comments upon the absence of civil arrangements for the assistance of sick and injured people, and valuable hints were given for the formation of street ambulances and the conversion of railway waggons for the same purpose on the lines of railway.

The proceedings of the Social Science Conference were resumed on Friday, June 27. Sir Richard Temple again occupying the chair.

The first paper was by G. W. Hastings, Esq., M.P., on the question "Is it desirable that the Notification of Infectious Disease should be obligatory?" He said this question was first brought forward in a paper read at Brighton, in 1875, and since then in thirty-eight towns some system of notification had been adopted, whilst during the present session several others would receive similar powers. It was, therefore, too late to say that it could not be done or that the results could not be foreseen; the real question was whether the system should be made universal, and if so what the conditions should be. The case of Edinburgh was taken as a typical instance, and the system in force there described. The duty of giving notice devolved on the medical attendant and no objection had been raised to it. Dr. Littlejohn, the Medical Officer of Health, reported that from 1879, when the system was introduced, up to the middle of 1883, he had received notifications to the number of 21,710 of the existence of typhus, typhoid, diphtheria, scarlatina and small pox, with the most useful results in checking the spread of these diseases. Similar testimony might be given from other places, and as applications were constantly coming forward, it seemed desirable that a general Act should be passed enabling any town or district to apply such measures without having to go to the expense of a special Act of Parliament.

Mr. James Bailey and Mr. Wm. Young having spoken against the proposed measure as interfering with the liberty of the subject,

Alderman Pollard (Halifax) gave the results of a system of compulsory notification in his town, which he was certain had been the means of saving many lives.

Dr. Dudfield (Medical Officer of Health, Kensington) spoke very strongly in favour of the proposal, as did also Dr. Wallace, Greenock, and Professor de Chaumont.

Mr. Hastings, M.P., in replying on the discussion, pointed out some errors into which the first two speakers had fallen, and gave instances from his own experience, showing the need for such a measure to prevent the spread of disease.

Mr. A. H. Brown read the next paper on the question "Is it desirable to legislate further respecting the Duties of Medical Officers of Health?" The first portion of the paper dealt with the great variety of areas, duties, and salaries allotted to officers of health in different localities, though these inequalities had been in some cases modified by combining two or more districts under one medical officer. Thus since 1875, two hundred and ninety-five separate authorities, each of which could appoint its own medical officer, had been combined into forty-two districts, with one officer for each. In many districts also a portion of the salary is paid by Parliament and the officers are irremovable, except by the consent of the Local Government Board. The duties of medical officers were then examined and shown to consist almost entirely in inspecting, advising and reporting; and some were disposed to advocate giving these officers larger powers, but the author thought this would only tend to increase the friction which to some extent existed at present, and on the whole, the conclusion come to was that an improved state of public opinion was the main thing to be looked to for getting sanitary measures more fully carried out. It was also desirable that, by means of combined districts, the area alloted to each officer should be such as to occupy the whole of his time, that he should not engage in private practice, but that the term of engagement should be lengthened and should not be liable to be cut short, except with the sanction of the Local Government Board.

Mr. Edwin Chadwick, C.B., Dr. Saunders, Medical Officer for the combined districts of Hertfordshire and Middlesex, Dr. Wallace and Dr. Dudfield took part in the discussion which ensued, and all insisted on the importance of officers of health being placed in an independent position. The proceedings concluded with a vote of thanks to the Chairman.

Obituary.

HENRY WATTS, F.R.S.

We regret to have to announce the sudden death, on Monday last, of Mr. Henry Watts, of syncope from failure of the heart's action.

Henry Watts was born in London on January 20, 1815. After receiving the usual school education in classics and mathematics, with the addition, unusual at that time, of good elementary instruction in physics and chemistry, he was articled at the age of fifteen to an architect and surveyor; but finding, after a few years, that he had entered a profession for which he was by no means adapted, he left it, and employed himself for some years in teaching, chiefly mathematical, partly as a school-assistant, partly as a private tutor. In 1841 he graduated as Bachelor of Arts in the University of London. In 1846 he entered the Birkbeck Laboratory of Chemistry, then recently established at University College, as assistant to his highly valued friend, the late Professor Fownes, and in that capacity was engaged in directing the work of the students till the death of Professor Fownes in 1849, and afterwards till 1857 under Professor Williamson. A professorship he was unable to obtain; being incapacitated from lecturing by a serious and incurable impediment of speech, with which he had been troubled from very early years; and for this reason he was ultimately induced to devote himself entirely to the literature of chemistry.

In 1848 Mr. Watts was engaged by the Cavendish Society to prepare a translation, with additions, of the

great "Handbuch der Chemie" of Leopold Gmelin, a work which extended to eighteen volumes, and occupied a large portion of his time for more than twenty years, the last volume and the index having been published in 1872.

In 1858 Mr. Watts was engaged by the eminent publishers, Messrs. Longmans and Co., to prepare a new edition of 'Ure's Dictionary of Chemistry and Mineralogy,' but finding that this book, the last edition of which appeared in 1831, had fallen too much behind the existing state of chemistry to be made the ground-work of a dictionary adapted to the requirements of the time, he undertook, with the consent of the publishers, and the assistance of a staff of contributors distinguished for their attainments in different branches of physics and chemistry, the compilation of a new 'Dictionary of Chemistry and the Allied Branches of other Sciences.' This work, in five large octavo volumes, was completed in 1868; but as additions were required to keep it abreast of the continual advances of science, a supplementary volume was published in 1872, a second supplement in 1875, and a third (in two parts) in 1879 and 1881.

Mr. Watts also brought out three editions of Fownes's 'Manual of Chemistry,' viz., the tenth published in 1868, the eleventh in 1872, and the twelfth in 1877. He held for many years appointments as Editor of the Journal and Librarian to the Chemical Society, having been appointed to the former in 1850, and to the latter in 1861. He was elected a Fellow of the Chemical Society in 1847, a Fellow of the Royal Society in 1866, and a Member of the Physical Society in 1879. He was also an Honorary Member of the Pharmaceutical Society, and a Life Governor of University College.

At the time of his death, Mr. Watts was engaged in writing a new and abridged edition of the 'Dictionary of Chemistry;' he was also, in conjunction with Mr. E. C. Groves, editing a re-edition of Knapp's 'Technology,' and the thirteenth edition of Fownes's 'Manual of Chemistry,' of which second the volume was left in manuscript.

Notice has also been received of the death of the following:—

On the 24th of May, Mr. Owen Roberts, Chemist and Druggist, Gaerwen, Anglesey. Aged 66 years.

On the 18th of June, Mr. Charles Smith, Chemist and Druggist, Stamford Street, London, S.E. Aged 64 years.

On the 21st of June, Mr. Edmund Taylor, Chemist and Druggist, Droitwich. Aged 44 years. Mr. Taylor had been a Member of the Pharmaceutical Society since 1869.

BOOKS RECEIVED.

RECENT MATERIA MEDICA. Notes on their Origin and Therapeutics. By F. HARWOOD LESCHER, F.C.S., etc. London: J. and A. Churchill. 1884. From the Publishers.

AN EPITOME OF THE REPORTS OF THE MEDICAL OFFICERS TO THE CHINESE IMPERIAL MARITIME CUSTOMS SERVICE, from 1871 to 1882. Compiled and arranged by Surgeon-General C. A. GORDON, M.D., etc. London: Baillière, Tindall and Cox. 1884. From the Publishers.

PHARMACOPŒIA OF THE VICTORIA HOSPITAL FOR CHILDREN. London: J. and A. Churchill.

HAY FEVER. Its Etiology and Treatment. By MOREL MACKENZIE, M.D. Lond. London: J. and A. Churchill. 1884.

COMPANION TO THE BRITISH AND AMERICAN HOMŒOPATHIC PHARMACOPŒIAS. By LAWRENCE T. ASHWELL. Third Edition. London: Keene and Ashwell. 1884. From the Author.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE RECENT PROSECUTION AT SHEFFIELD.

Sir,—Is the prosecution at Sheffield to be taken as the commencement of a new departure on the part of the Council, and is it to be followed up by similar prosecutions in other parts of the country? If so, it will rejoice the heart of many an unhappy druggist who is suffering from the competition of these unqualified traders, and will do more to increase the popularity of the Society and extend its influence amongst the chemists and druggists than any other thing they could have done; for besides being the most effectual means of putting a stop to the sale of poisons by these people it will eventually stop a good deal of their trade in other drugs as well. If once it became known that the Society had taken the matter in hand, and meant to follow it up, these outside traders would very quickly discontinue the sale of anything containing poison, and would be very cautious in dealing with other drugs of whose composition they were ignorant, lest "poison" should be found in the cup.

A great deal of the dissatisfaction with, and unpopularity of the Society amongst the chemists and druggists is owing to the backwardness of the Council in taking action on this matter, and allowing these prosecutions to be instituted by anybody or nobody as might happen, and although we read in the Annual Reports that certain persons have been proceeded against, and have paid £5 each, it really amounts to very little, and does not touch these grocers and general shops at all, for there is no publicity about the matter, the individual (who is generally an unregistered druggist) pays his £5 and goes on again, whilst nobody else knows anything about it; but a public prosecution, like the one at Sheffield, becomes known to everybody, and does more towards suppressing the illegal trader than a hundred cases not brought into court.

The complaint has been made that there is great difficulty in procuring evidence in these cases, but there will be no difficulty in procuring evidence and no backwardness in supplying information if it be known that the Society will act and act publicly; but people will not take the trouble to give information or collect evidence when they find the only result to be a letter from the Secretary telling the offender that he is violating the law, and begging him not to do it again.

Cheetham Hill. W. WILKINSON.

J. R. Hill.—All that was done was to chronicle the fact that the meeting took place; a discussion as to the propriety of such a course would be out of place in this Journal.

Amo.—You are recommended to communicate all the facts of the case to the Registrar, who will probably advise you on the point as to which you are in doubt.

H.—The strength you have hitherto adopted is that generally used in this country.

A. P.—The elixir belongs to a class of strongly alcoholic preparations, the formulæ for which differ considerably, but you will find illustrations of the elixir of potassium bromide in vol. ii., p. 973, and vol. iv., p. 683, of the present series of this Journal. Fluid extract of cannabis indica is official in the United States Pharmacopœia, and is made by percolating the powdered flowering tops of Indian cannabis with alcohol, sp. gr. ·820. The finished product represents in c.c. the number of grams of the drug used.

Minor.—Scoresby-Jackson's 'Note-Book,' or Garrod's 'Materia Medica.'

Mel.—(1) A formula for aqua mellis will be found in vol. xi., p. 871. (2) Possibly the ingredient mentioned may promote the growth of the ferment, but we do not think it takes any more direct part in the fermentation.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hutchinson, Robinson, Johnston, McCammon, Deighton, Heindé, Shenstone.

ALLEN & HANBURYS' Granular Effervescent Preparations.

	Per lb.
Ammonium Bromide (*Granular & Effervescent*)	3/
Bismuth Ammonio-Citrate „ „	3/
Bismuth and Iron ... „ „	6/
„ and Pepsine ... „ „	6/6
„ Pepsine and Iron „ „	6/6
„ „ and Strychnine „	8/
„ „ and Quinine „	8/6
„ „ and Bromide of Potassium	8/
„ „ Iron and Strychnine „	8/
Caffeine Citrate ... ... „ „	8/
Carlsbad Salts ... ... „ „	2/8
Cerium Nitrate ... ... „ „	4/
„ Oxalate ... ... „ „	3/6
Cheltenham Salts ... „ „	2/8
Cinchonine Citrate ... „ „	3/4
„ „ and Iron „ „	3/4
Friedrichshall Salts ... „ „	2/8
Iron Ammonio-Citrate ... „ „	2/8
„ Bromide ... ... „ „	4/
„ Carbonate ... ... „ „	2/
„ Citrate ... ... „ „	2/6
„ Iodate ... ... „ „	4/6
„ Iodide ... ... „ „	3/
„ Phosphate ... ... „ „	2/8
„ and Arsenic ... „ „	4/6
„ and Magnesia Sulphate „ „	4/
Kissingen Salts ... ... „ „	2/8
Kreuznach Salts ... „ „	2/8
Leamington Salts ... „ „	2/8
Lime Hypophosphite ... „ „	3/6
„ „ and Pepsine „	6/
„ and Soda Hypophosphite „	3/6
Lithia Carbonate ... „ „	4/
„ Citrate ... ... „ „	4/

	Per lb.
Lithia Citrate and Potash (*Granular & Effervescent*)	4/
MAGNESIA CITRATE ... „ „	1/6
„ in 4-lbs. and 7-lbs. Bottles	1/5
„ 2nd quality „	1/2
Marienbad Salts ... „ „	2/8
Nux Vomica ... ... „ „	4/6
Potash Benzoate ... „ „	4/
„ Bicarbonate ... „ „	2/8
„ Bromide ... „ „	3/
„ Chlorate ... „ „	2/8
„ Citrate ... ... „ „	3/
„ Iodide ... ... „ „	3/
„ Nitrate ... ... „ „	2/6
Pullna Salts ... ... „ „	2/8
Quinine Citrate ... ... „ „	8/
„ „ and Strychnia „	6/6
„ „ and Iron „ „	6/
„ „ Iron and Bromide of Potassium	6/6
„ „ „ Iodide of Potassium	6/6
„ „ Iron and Strychnia „	6/6
„ „ and Iron Phosphate „	6/6
„ Iodate ... ... „ „	10/
„ Salicylate ... „ „	10/
„ and Caffeine Salicylate „	10/
Seidlitz Mixture ... „ „	2/
Seltzer Salts ... ... „ „	2/8
Soda Citro-Tartrate ... „ „	2/
„ Hypophosphite ... „ „	3/6
„ Iodide ... ... „ „	3/
„ Nitrate ... ... „ „	2/6
„ Phosphate ... „ „	2/6
„ Salicylate ... „ „	4/6
„ Sulphate ... ... „ „	2/8
Vichy Salts ... ... „ „	2/6

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Those for Businesses, Assistants, Engagements, &c., will be found on page XXII.

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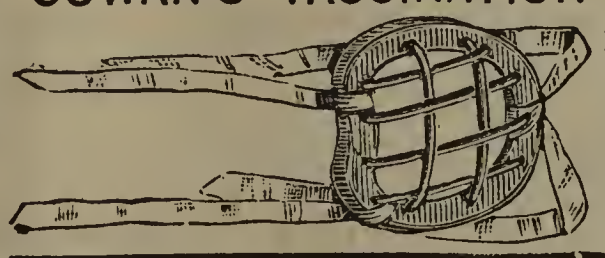

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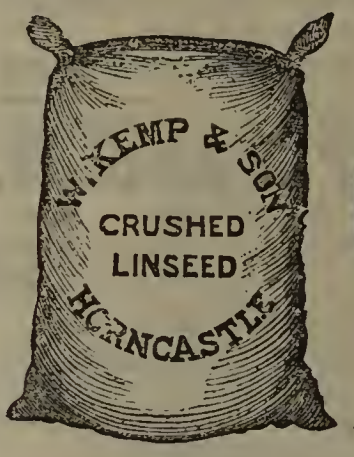

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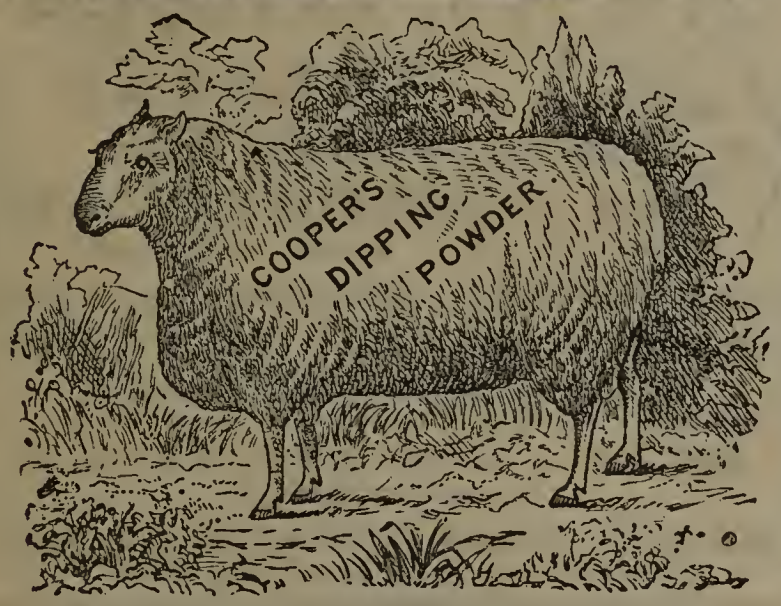

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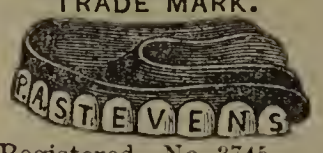

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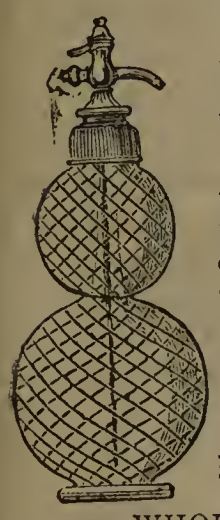

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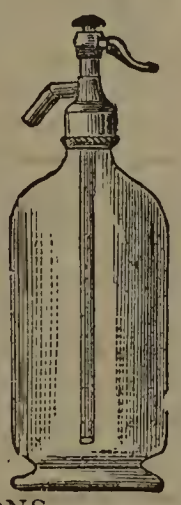

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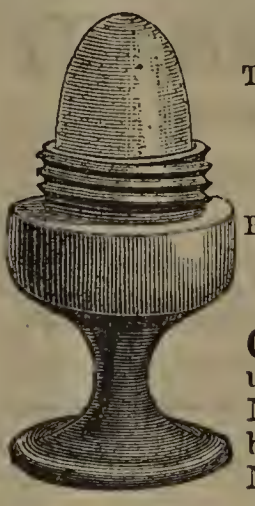

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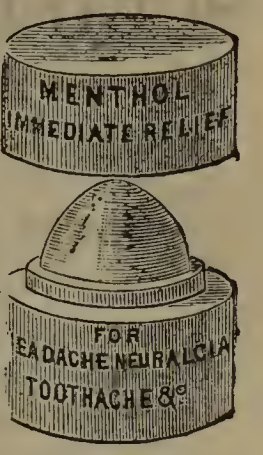

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MINOR

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„ C. G. DAVIES..... London.
„ J. R. EVANS .....Dowlais.
„ L. J. W. JONES.....Swansea
„ W. G. SLOAN.....Barking.
„ G. STEVENSON .....Sutton-in-Ashfield.

No Major Students presented themselves from this College.

The next Session will commence on Monday, September 1st.

Students intending to enter on the above date are requested to send in their names as early as possible, so that benches may be reserved for them.

FEES:—

To the October Examination	...	£5 5s.
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OUT-DOOR ASSISTANT, in London. Age 25. Qualified Advertiser, having large capital would entertain succession or partnership. MINOR, care of Mr. Urwick, 60, St. George's Rd., Pimlico.

THE advertiser, with 20 years' experience as an employer in good country and town businesses, seeks engagement as MANAGER, permanent or temporary. Has a thorough knowledge of all branches of the trade, is a quick and good Salesman, Dispenser and Prescriber. Age 42. M. P. S., Eglantine House, Hunstanton, Norfolk.

AS MANAGER. 30. Married. Now disengaged. Open for temporary engagement until permanently suited. CHEMICUS, 3, Fazackerley Ter., Ashton-on-Ribble, Preston.

AS ASSISTANT or to MANAGE. 13 years in Retail and Prescribing. Single. Qualified. Would not object to Wholesale. E. V. TURNER, Tower Hotel, Manchester.

AS JUNIOR in good class Dispensing business. 6 years' experience. Age 21. Height 5ft. 7in. E. A. L., 15, East St., Chichester.

ASSISTANTS WANTED.

J. DAY, Chemist, Savile Town, Dewsbury, is in want of a Junior ASSISTANT, about the end of July, to Manage a Branch. One accustomed to a Mixed trade, oils and paints, and desiring a permanency will find a comfortable home. If convenient send photo., stating salary required and references.

AT once.—Two DISPENSERS, accustomed to good class of business. Personal application preferred to DECASTRO & Co., Wilton Pl., Belgrave Sq.

AN out-door ASSISTANT, well up in Dispensing and a good Counter Hand. Apply, giving full references, enclosing carte de visite, and stating salary expected, to GOULDINGS, Cork.

ASSISTANTS WANTED.

AT once.—An ASSISTANT for a good class business. One accustomed to Dispensing. Apply personally if possible to T. W. LEAKE, 44, Hampstead Hill Gardens, N.W.

AN ASSISTANT, not under 22, in a first-class Dispensing business, where 2 are kept. Must be a neat and accurate Dispenser and well-up to his business. Apply, stating full particulars to D., care of Messrs. Davy, Yates, and Routledge, 64, Park St., Southwark.

IMMEDIATELY for a Widow. A MANAGER accustomed to a mixed and light Retail business, with Prescribing. Must be steady and have unexceptionable references. Duties light. Comfortable home insured. Apply, stating age, salary required, and enclose photo. to E. B., 71, High St., Miletown, Sheerness-on-Sea.

AN energetic ASSISTANT for the Retail. No Sunday duty. Mixed Agricultural trade. State age, height, salary required for out-door, enclosing photo. if convenient. Good references indispensable. W. KEMP & SON, Chemists, Horncastle.

IMMEDIATELY. — Junior ASSISTANT, possessing Minor qualification. Apply, with full particulars, to GUYER & SHAPLEY, Torquay.

A MANAGER, about 30, for a good business, able to Prescribe, Extract Teeth, &c. Must have good references. Address, 165, Stanley Rd., Liverpool.

HASTINGS and St. Leonards Provident Dispensary. —Wanted by the 22nd July, a DISPENSER for the above Institution. Steady, careful and quick. No Sunday duty. Salary £90 per annum. Apply, with references, to Rev. ALFRED TURNER, 5, St. Paul's Pl., St. Leonards-on-Sea.

A COMPETENT ASSISTANT, to take the lead during the absence of the principal. Two others kept. For a good class Dispensing and Retail business. Reference must be unexceptionable. Enclose carte. PADWICK, The Pharmacy, Redhill.

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A JUNIOR, at once. Two evenings a week allowed for study. Salary 25s. per week. Out-door. Apply, MANAGER, 393, Commercial Rd., E., London.

IMMEDIATELY.—A steady ASSISTANT, able to Dispense correctly and also to speak Welsh. Apply, with usual particulars, W. H. KEY, Chemist, &c., 89 & 90, Taff St., Pontypridd.

GOOD ASSISTANT, for British Colony. Must be honest, strictly sober, industrious, and thoroughly understand Dispensing, &c. Those who can Extract Teeth will be preferred. Full particulars on application. When writing, state age, height, and qualification. T., Davy, Yates & Routledge, 64, Park St., S.E.

ASSISTANTS WANTED.

IMMEDIATELY.—A Junior ASSISTANT in a light Retail and Dispensing business. Good references indispensable. Apply, stating salary required and usual particulars, to F. KIRBY, 114, Abington St., Northampton.

A COMPETENT ASSISTANT, age about 24, for a first-class Retail and Dispensing business. Apply, stating age, height, references and salary required, also carte (to be returned), to PHARMACIST, 13, Whitefriargate, Hull.

SOUTH London School of Pharmacy.—ASSISTANT for India. Age 27. Major qualification. Single. An Old South London will have the preference. Salary to commence £150 or £200, according to circumstances, rising £25 per annum. First-class passage, via Suez paid out. Address, W. BAXTER, Secretary, 325, Kennington Rd., S.E.

ABOUT the end of July, an ASSISTANT, not under 22. Accustomed to good class business. Qualified preferred. Apply, stating salary and usual particulars to W. MCKINNELL, St. Giles Sq., Northampton.

MANAGER, qualified, unmarried, to a suburban business, with view to purchase by part payment of £400 to £500 if desired. Salary to begin with £100 a year and furnished bedroom. A personal interview would be necessary, but apply first by letter to B., 11, Dalberg Rd., Brixton, S.E.

IMMEDIATELY.—A young man, age about 22, of good address and accustomed to Dispensing. Apply, stating full particulars, to JAMES GARNER, 119, Kensington High St., W.

A COMPETENT ASSISTANT, age about 22. Apply to C. EDWARDS, 81, Cornwall Rd., Westbourne Park, W.

JUNIOR ASSISTANT, accustomed to Agricultural trade, and able to Extract Teeth. Apply, stating age, height, salary required, reference and carte, if convenient, to H. C. WEBB, Chemist, Buckingham. Carte to be returned.

AN ASSISTANT at once. About 30, for light Retail. May be required to Manage Branch establishment. One with knowledge of Postal work preferred. Apply to FREDERICK FORE POTT, Chemist, 64, Old Chester Rd., Lower Tranmere.

AS MANAGER, in-door, suburbs of Birmingham. Must be competent, qualified, single, and character to bear strictest investigation. Apply, with photo. and full particulars to Mrs. M. A. GOULD, Chemist, Harborne, near Birmingham.

AN ASSISTANT, about 21 years of age. In-doors. To travel 2 days a week. Apply stating age, salary, height, with references and carte, to EDWARD VINSON, High St., Maidstone.

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JUNIOR ASSISTANT, by July 21, with good references. Accustomed to a light Retail and Dispensing business. Apply, with usual particulars, to Mr. SPENCER, Chemist, Wimbledon.

A GOOD JUNIOR, in-doors, not under 21, in light Retail and Dispensing. Two kept. State age, height, salary, and all previous engagements. Enclose carte, if convenient, which will be returned. A. C., Messrs. Herrings & Co., 40, Aldersgate St., E.C.

AT once.—A competent and qualified ASSISTANT for light Retail and Dispensing. Not under 22 years of age. One only employed. Apply, by letter, stating full particulars, or personally, to C. B. MILLER, Dispensing Chemist, Blackheath, S.E.

ASSISTANTS WANTED.

AN Assistant, about 22. Capable of taking entire charge during principal's absence. Some knowledge of travelling preferred. One working for Minor greatly assisted. State salary, in-doors, how soon disengaged, and reference, which must be good, and enclose photo. (which will be returned), to G. J. R. Parkes, A.P.S., Medical Hall, Wolverhampton.

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A QUALIFIED Assistant immediately, for Shipping and Retail business. Out-door. Hours easy. No Sunday trade. Age 22 to 26. Apply, stating salary required, J. Riddle, Argyle Ter., Westoe, South Shields.

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A QUALIFIED Assistant, out-door, about 22 years of age, accustomed to Dispensing and a good country business. Apply, with references, to H. W. Allen & Neale, King's Lynn.

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AN Assistant, about 22 years of age. Also a well-educated youth as Apprentice. Apply to J. A. Seys, Newport, Mon.

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AN Assistant, accustomed to a good class Dispensing and general Retail trade. Minor qualification. Salary £50. Address J. G. W., 4, Priory St., Coventry.

AN active Junior Assistant, in-door, in a good class, Mixed business. Must be a good Dispenser. Apply with full particulars, enclosing carte, if convenient, to T. R. M., care of Messrs. Meggeson & Co., Miles Lane, London.

AN Assistant, for 3 or 4 months. Must have passed Minor exam. Apply, stating salary, &c., to J. Burton, Chemist, Llandudno.

AN Assistant, in-doors, for a Surgeon's Retail. Should be able to Prescribe and to Dispense well. Apply to B., 19, Eccleston St., Pimlico, S.W.

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BIRMINGHAM, Suburbs. — Immediately. Retail Business in a populous and healthy locality. The shop is in a commanding corner position near a railway station. Large and roomy house. Rent £45. For particulars, apply B., care of Southall Bros. & Barclay, Birmingham.

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DISPENSING Screen, 5ft. 6in., with counter under, fitted with drawers and plate glass cases in front, a bargain; Dispensing Screens, 5ft., 6ft., 7ft., glass case at each side, with silvered plate-glass centre, with marble slab in front, with carved wood on top, 3ft. high, the cases at each side have plate-glass doors, with tablets on top, 2ft. high, inside each case fitted with silvered glass and shifting shelves; as fig A 53, 5ft. 6in. long, 7ft. 6in. long; as fig. A 54, 4ft. long; as fig. A 55, 5ft., 6ft., 7ft. 6in. long; Sponge Case, A 43; a Centre Case, 8ft. long, 5ft. wide, mahogany; a number of other size Screens and Cases, very cheap. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 733.] SATURDAY, JULY 12, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
Inquiry into the Reducing Action of Vaseline and Paraffin on Permanganate of Potassium and Nitrate of Silver when contained in Pills. By G. Smith	21
Note on Tu-Tu (Coriariæ Ruscifoliæ). By T. H. Hustwick	22
Absolute Alcohol. By Dr. Squibb	22
Alkali-Proof Vessels. By Professor Dittmar	25
Sodio-Bismuth Citropyroborate. By R. Rother	28
The Nomenclature of the Alkaloids of Atropa Belladonna and Datura Stramonium. By E. Schmidt	29
Microscopical Examination of Malt. By G. L. Barb	30
EDITORIAL ARTICLES AND NOTES :—	
The Future of the Soda Industry	31
Dr. Shoemaker on the Oleates	32
Notes:—The Medical Acts Amendment Bill—Dr. Shoemaker on the Oleates—Sir Henry Roscoe—Institute of Chemistry—A Fatal Mistake—Jamaica Ginger—Cinchona in Gualemala—Lactic Acid	32
PROCEEDINGS OF SCIENTIFIC SOCIETIES :—	
Society of Chemical Industry :—	
Annual Meeting	33
President's Address	33
The Annual Dinner	38
International Health Exhibition	40

Pharmaceutical Society of Great Britain.

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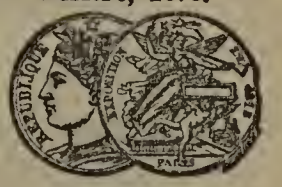

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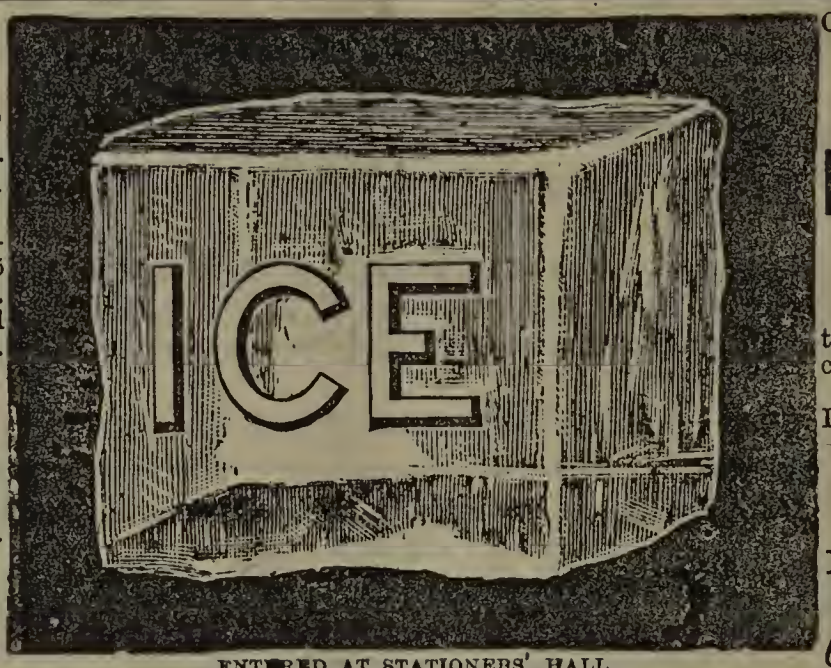

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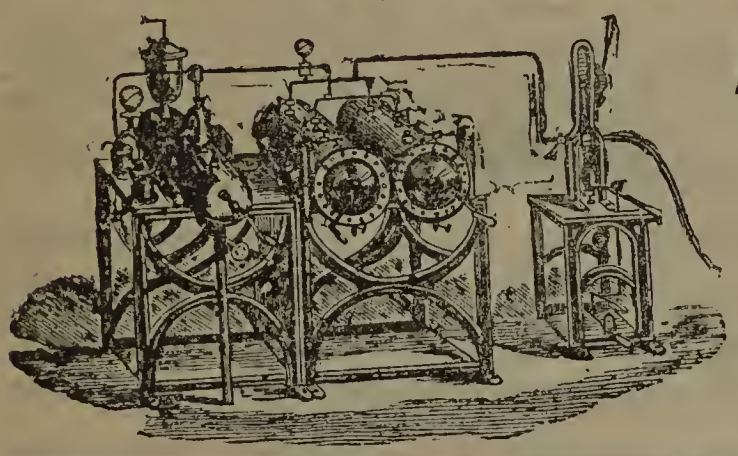

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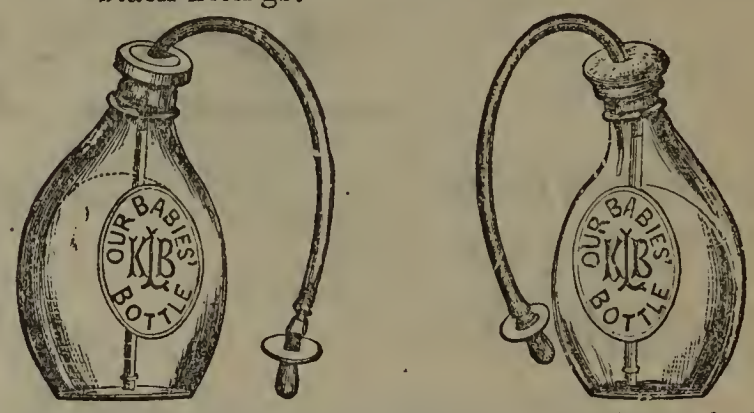

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"New York Medical Journal," *August* 1880,
Dr. F. Weir,
in Lecture delivered to the College of Physicians and Surgeons, New York.

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INQUIRY INTO THE REDUCING ACTION OF VASELINE AND PARAFFIN ON PERMANGANATE OF POTASSIUM AND NITRATE OF SILVER WHEN CONTAINED IN PILLS.

BY GEO. SMITH, F.C.S.

Mr. Martindale suggested, in a letter to the *Pharmacentical Journal* for January 13, 1883, the use of a mixture of vaseline, 2 parts, paraffin wax, 1 part, and kaolin, 3 parts, as a convenient and non-oxidizable excipient for making permanganate of potassium into pills. On January 28, 1883, some pills containing 2 grains of the salt in each, and 3 grains of the above excipient, were made by the writer, and coated at the same time with a solution of gum sandarac in absolute alcohol, as recommended by Mr. Martindale. Owing to other engagements their examination was not attempted till June 26 last.

The results obtained may be of interest to those who may have occasion to prescribe or dispense this remedy.

As a preliminary, on boiling one of the pills in a little distilled water, ample evidence of the presence of unreduced permanganate was obtained.

Three of the pills containing 6 grains of the salt (=·3888 gram) were treated with distilled water (under 35° C.), until all soluble permanganate was extracted. The resulting cloudy solution was made up to 500 c.c., and estimated with a volumetric solution of oxalic acid containing 6·3 grams per litre. A mean of three estimations made on 50 c.c. at each time, proved that 70 per cent. of the permanganate originally present in the pills had been reduced.

It was observed that the sandarac coating reduced the permanganate as fast as it went into solution at first, and that only after the former was completely oxidized, did the characteristic deep reddish-purple colour of the permanganate begin to appear. Obviously this reduction was considerable, and to avoid it, the pills were carefully scraped, and the coating removed as completely as possible. One gram of the scraped mass (representing ·4 gram permanganate) was broken down and treated with successive portions of distilled water (under 35° C.) until all the soluble contents were removed, and the resulting solution allowed to settle in a beaker. When moderately clear, it was decanted and passed through glass-wool into a flask, the residues washed, and the whole made up to 500 c.c. Two series of estimations were made on 50 c.c. and 100 c.c. each of the solution. The following are the numbers obtained:—

(*a*) 50 c.c. required 6·7 c.c. oxalic solution to complete decolorization.

(*b*) 50 c.c. required 6·6 c.c. oxalic solution to complete decolorization.

(*c*) 100 c.c. required 13·7 c.c. oxalic solution to complete decolorization.

(*d*) 100 c.c. required 13·6 c.c. oxalic solution to complete decolorization.

Mean, =13·53 c.c. of volumetric solution of oxalic acid required to decolorize 100 c.c. of permanganate solution.

Then 13·53 c.c. × ·00314 = ·04248 $K_2Mn_2O_8$ (found) = 53·1 per cent.

The filtration through glass-wool did not entirely free the liquid from suspended manganic oxide. This interfered slightly with the accuracy of the readings. It is noteworthy that the *absence of the resinous coating* increases the percentage of unreduced permanganate from 30 to 53·1.

Estimation of Pills containing Silver Nitrate.—These pills, when examined, had been made eighty-five days. Two strengths were estimated, (No. 1) containing 2 grains, and (No. 2), ½ grain each respectively of the salt. Both were made up to a total weight of 5 grains each by means of Mr. Martindale's excipient. They were *not coated.*

One gram of No. 1 (representing ·4 gram of silver nitrate) was carefully broken down under distilled water at the ordinary laboratory temperature (about 20° C.), by means of a glass rod. The silver nitrate entered readily into solution. The total liquid collected was allowed to settle, then filtered through glass-wool, the residue and wool being washed till free from traces of silver salt, and the solution made up to 500 c.c. Some finely divided kaolin still remained suspended in the liquid. This prevented an accurate gravimetric determination. Instead, two series of separate volumetric estimations were made on 50 c.c. and 150 c.c. respectively, using a solution of ammonic thiocyanate (of which 1 c.c. had been ascertained to equal ·0171 gram of commercial crystals of silver nitrate) with iron alum as indicator. The following are the numbers obtained:—

(*a*) 50 c.c. silver solution required 2·4 c.c. NH_4CNS solution.

(*b*) 50 c.c. silver solution required 2·35 c.c. NH_4CNS solution.

(*c*) 150 c.c. silver solution required 7·1 c.c. NH_4CNS solution.

(*d*) 150 c.c. silver solution required 7·05 c.c. NH_4CNS solution.

Mean = 4·725 c.c. NH_4CnS solution required to completely precipitate 100 c.c. of silver nitrate solution.

Then 4·725 × ·0171 = ·08079 $AgNO_3$ (found) = 100·99 per cent.

The whole of No. 2 batch of pills was next estimated. One dozen were made, and it was considered desirable to estimate the *whole* of the silver nitrate *known to be contained in them* (=6 grains= ·3888 gram), after the high results obtained by operating on a portion of No. 1. The *modus operandi* was the same as with No. 1, and the following are the figures obtained:—

(*a*) 150 c.c. silver solution required 6·75 c.c. NH_4CNS solution.

(*b*) 150 c.c. silver solution required 6·7 c.c. NH_4CNS solution.

Mean = 4·483 c.c. NH_4CNS solution to completely precipitate 100 c.c. of silver nitrate solution.

Then 4·483 × ·0171 = ·07666 $AgNO_3$ (found) = 98·5 per cent.

These numbers require no comment, the high results obtained with No. 1 pills are probably owing to the imperfect mixing of the ingredients. Both numbers show conclusively that the paraffin excipient has no reducing action on nitrate of silver.

In conclusion, Professor Armstrong suggests that part of the reduction observed in the permanganate of potassium may be due to a contamination of the vaseline and paraffin wax with solid homologues of the olefine series (C_nH_{2n}). On the other hand the increase of over 23 per cent. of unreduced permanganate obtained when the influence of the sandarac coating is, as far as possible, eliminated, makes it desirable to continue the experiments further *on uncoated pills*, or *pills coated with melted paraffin mixture only.* The writer finds that pills coated with a mixture of white vaseline and paraffin wax

can be sugar-coated in the usual manner without much difficulty. In any case, the foregoing experiments prove that sandarac coating, or any organic resinous coating whatever, is inadmissible with pills containing permanganate of potassium.

Further experiments will be undertaken with permanganate, including, at the same time, trials with authentic specimens of terchloride of gold, and the double chloride of gold and sodium. If reduction should take place, and appear to arise from any impurity contained in the vaseline or paraffin wax, then a process may perhaps be devised to get rid of this drawback.

My thanks are due to Professor Armstrong, for kindly allowing this investigation to be carried out in the laboratory of the Technical College, Finsbury.

NOTE ON TU-TU (CORIARIÆ RUSCIFOLIÆ).

BY T. H. HUSTWICK.

The "tu-tu" plant (pronounced "toot," the final vowel in many Maori words being only an aspirate or lip sound is dropped by Europeans) is indigenous to New Zealand. It grows luxuriantly where situation is favourable, and prefers an exposed site on rising ground, with a dry friable soil; its average height, when mature, may be taken at about 5 feet, of a shrubby herbaceous character, and with its spreading branches covering a considerable extent of surface. Surrounded by sombre ferns and withered grasses, the effect of its glossy dark green foliage is very striking.

Tu-tu, though commonly spoken of as a poison, is such only under certain conditions, and even not then to all animals,—the horse, goat, and pig being said to be entirely proof against it under all circumstances; while, conditions being favourable, cattle and sheep often fall victims to it. The season of its greatest activity is in spring; then, the wide spreading roots throw up numerous tender, succulent shoots, which are eaten with avidity by sheep fresh from the hills, where dry grasses and ferns have been the rule. Cattle browse on the young leaves, and when coming to them fresh from other pastures, or exhausted by labour or travel, nearly always with fatal effects. It is said that later in the year the poisonous property is greatly diminished; that even when most virulent its effects are much ameliorated by a previously full stomach, and that the system can become accustomed to it by gradual use. Animals suffering from the effects of this plant are said to be "tooted." Its principal action seems to be on the brain and nervous centres, and produces a condition similar to "staggers." The animal becomes stupid and lethargic, until roused into a fit of mad frenzy by any trivial circumstance, during which it is dangerous for man or beast to be in the way, the frenzy recurring at rapily decreasing intervals, until death results in a few hours from sheer exhaustion. The only remedy that appears to be used is bleeding from the jugular vein, and that with very poor success, not one in ten being benefited, while the exceeding danger attending its use causes it to be practised only under exceptional circumstances. I am not aware what is the effect of the green herb on man, but singularly enough the "berries" when ripe are grateful and refreshing to the thirsty palate, care being taken to reject the seeds A common method of utilizing the fruit is by tying a few bunches in a handkerchief and sucking the juice through it. Small birds are very partial to the ripe fruit and no injurious effect on them is apparent; most probably the seeds are voided by them entire. In the early days of the colony, when bullock labour was universal, whole teams were sometimes destroyed or disabled in a single night by this pernicious plant, rendering great care necessary in the choice of a camping place. The immunity enjoyed by the goat in respect of this plant was some years ago made use of on the Flaxbourne sheep run, a large number of these animals being procured for the especial purpose of securing its eradication. That an animal to whom the varied contents of a choice flower garden are a comestible delicacy should be proof against this particular plant is not to be wondered at, but why the plant should be so powerfully toxic as regards other ruminants is a matter for surprise.

ABSOLUTE ALCOHOL.*

BY DR. SQUIBB.

It is not difficult to get alcohol practically free from all impurities, including water as one, but to free it from the last one-thousandth part of water is very difficult indeed,—so difficult, that traces of this ultimate fraction of water have so far always been retained. Hence in considering it as absolute alcohol it can only be regarded as being freer from all other impurities than from water, and as being more or less free from water. No alcohol should be called absolute, however, that contains less than 99·4 per cent. by the best determinations. When carefully freed from all impurities except water, specific gravity becomes a very accurate indication of strength, and it has always been relied upon as the decisive test. For many years each careful observer reduced the specific gravity little by little to those upon which the tables of the present day are based, by using new appliances which the progress of knowledge supplied to his hands, and the object of this note is to show that improvement in these appliances is not yet at an end.

Some writer has well said, in substance, that in the advancement of knowledge the position of each day should be occupied as the nomadic Arabs occupy their tents, ready at any moment to pick up and move on.

In the manufacture of absolute alcohol in considerable quantities by the very slow, cold percolations through large and successive portions of quicklime, the writer has not unfrequently seen it come from the rectifying still of a specific gravity below that of the lowest of the tables and of the best and most recent authorities; and the entire product of the process for the past two or three years has been of such strength that all the hydrometers tried have sunk below the reading scale. In one instance a Government inspector pronounced the alcohol to be 102 per cent. strong!! Another inspector made it 99·8 per cent., but he could not possibly have done this with his official instruments, because his hydrometer would sink below the reading scale, oven when the alcohol has been exposed to the air by several trials. These observations were made upon alcohol that, having been managed with a considerable air contact, could not be completely anhydrous, since very strong alcohol takes moisture from the air very rapidly indeed, and changes proportionately in specific gravity. It was therefore concluded that the tables were all too high for the present time, and that the subject merited a reinvestigation. This was undertaken, and has been carried out with much care and pains through the past three months, with the results now to be offered.

Preliminary to the investigation the authorities on the subject were carefully examined. They were found to be very numerous, very discordant, and in an almost

* From *Ephemeris*, May, 1884.

hopeless state of confusion. Much of the discord and confusion arises from the use of different standards of volume in taking the specific gravities; from failure to state what standard was used, and from making the observations at many different temperatures.

In 'The Constants of Nature,' compiled by Frank Wigglesworth Clarke, S.B., and published by the Smithsonian Institution, no less than thirty-three specific gravities from twenty authorities are given, with the statement that the compiler considered it best to give only the more important determinations. Hardly any two of these are in fair accord, the same authority often giving several different determinations.

Three standards of volume, at least, appear to be in common use, and as they are rarely stated they have to be either deduced or inferred.

The general statement of good authorities,—Watts's 'Chemical Dictionary,' for example,—is, that in Great Britain the standard volume for unity is a volume of pure water at 60° F.=15·6° C., while in France and Continental Europe generally the volume of water at 4° C.=39·2° F. is taken for the unity standard.

It is probable from some of the figures given that some of the authorities give true specific gravities,—that is, where equal volumes of the standard water and the alcohol are weighed at the same temperature and corrections applied for difference in density between the substance and the weights used. But it is equally probable that most of them give apparent specific gravities; that is, where the standard is at one temperature, and the equal volume of the alcohol is weighed at another temperature, without corrections either for expansion of the vessel used, or for density of weights or barometric pressure.

These apparent specific gravities are far the most useful, and therefore, most important, and if a common standard was adopted they would be all sufficient, because easily and quickly taken, and easily compared with sufficient accuracy.

In true specific gravities,—that is, where the standard and the liquid of the same volume are weighed at the same temperature,—the chief correction to be applied is for difference in density between the liquid and the weights. This error is in the fifth decimal place, and is only important when a very high degree of scientific accuracy is aimed at. The error is plus and has to be subtracted, the observed weight being that much greater than it would be in a vacuum. It, therefore, makes the observed specific gravity too high.

In apparent specific gravities, that is, where the liquid is weighed at other temperatures than that of the standard, another error comes in, and that a much greater one, namely, the expansion of the vessel in which the weighing is done. A glass vessel holding 1000 grams of water at its maximum density, or 4° C., will so expand at any higher temperature as to hold ·025 gram more of water for each 1° C. This is also a plus error, making the observed weighing greater than it should be, but as it requires 20° C. to make it reach the third decimal place, in the specific gravity of alcohols, it is not of great practical importance in every-day uses.

In specific gravity tables for daily use in the arts, neither of these corrections should be applied, because it is neither convenient nor easy to apply them in common practice to the liquids which are to be compared with the tables. Any one can take apparent specific gravities quickly and with a fair degree of accuracy, and in referring these to tables there should be an accord between the observations and the tables. Besides, when these corrections are disregarded the errors are still within the sphere of error of the tables in common use. The closest attainable specific gravity for absolute alcohol being reached, and being stated both in apparent and true terms to the fifth decimal place, is all that is needed to correct the tables at any desired point, leaving the more general correction to be made as better usage may demand it.

The very numerous and very discordant authorities on the strength of absolute alcohol have been frequently noticed and criticized of late years, and nowhere better than by the eminent Russian authority, Mendelejeff, and the accuracy, care and labour of this author have given the example which the writer has tried to imitate in the following investigations.

D. Mendelejeff published in St. Petersburg, in 1865, a quarto volume of one hundred and nineteen pages, exclusively on the subject of absolute alcohol. A copious abstract of this paper was published in the *Zeitschrift für Chimie*,—Beilstein and Fittig, 1865,—under the heading "Ueber die Verbindung des Weingeistes mit Wasser." From this abstract the writer's assistant, Miss Marie O. Glover, S.B., made notes and translations, of which great use has been made in this paper. Mendelejeff is not only the latest but by far the best authority which has been found on the subject. He reached a true corrected specific gravity of ·79367 at 15° C., compared with water at 4° C., which is practically in accord with Fownes and Drinkwater, and nothing could be usefully added to his admirable researches, except that the improved mechanical appliances of the twenty years since he wrote have probably brought it within the reach of any one going over the subject at the present day to obtain an alcohol that is more nearly anhydrous.

The very thorough investigations of Gilpin for the British Government from 1788 to 1794, and published complete in the 'Philosophical Transactions' of the latter year, brought the strength of alcohol to a specific gravity about ·7939 at 15·6° C.=60° F. compared with water at 4°.

Fownes ('Philosophical Transactions,' 1847) and Drinkwater* each went over the subject some fifty years later, and brought the specific gravity down to ·7938 and ·79381 at 15·6° C.=60° F., compared with water at the same temperature.

Kopp, in his elaborate researches on the expansion of liquids by heat, in 1855 and 1856, embraced alcohol among the liquids, and he is often quoted as authority for the specific gravity of absolute alcohol. But the best results given by him are considerably above those of earlier and later observers, and it is doubtful whether he supposed that he obtained anhydrous alcohol, or sought for it especially, since it was not demanded by the line of his special research.

Next came Mendelejeff, with the paper previously referred to, and these were the chief among the many original observers. In regard to the work of Gay-Lussac and Tralles, Mendelejeff remarks, in substance, that their numerous grave errors place them outside the pale of rational criticism. And to these the commonly accepted German authority, Stampfer, may well be added.

It is particularly unfortunate that these three authorities should, by the construction of their elaborate tables upon erroneous bases, have misled the world for so many years upon this enormous alcohol interest.

Tralles, in 1811—Gilbert's *Annalen*, xxxviii., 386,†—adopting Gilpin's researches as far as they want, deduced a specific gravity for anhydrous alcohol of ·7939 at 15° C.=59° F. compared with water at 4°. This was nearly correct from his data. But he does not use this, and does use instead, as the basis of all his work, an erroneous equivalent to it. He states that this specific gravity is equivalent to ·7946 at 15·6° C.=60° F. compared with water at 15·6° C.=60° F., and upon this statement all his tables, excepting one, are based. The one exception, namely, that based on a temperature of 15° C.=59° F. compared with water at 4° C., is not used except as a basis for his erronnous deduction. Instead of ·7946 at 15·6° C. compared with water at 15·6° C.

* 'Memoirs of the Chemical Society,' 1848, vol. iii., p. 447.

† Quoted from Watts's 'Dictionary of Chemistry,' p. 83.

being the equivalent to ·7939 at 15° C. compared with water at 4° C. the difference is only about ·00021, making the specific gravity he should have deduced from his data about ·79411.

Gay-Lussac, in 1824, practically reaches the same error with Tralles, which he appears to adopt from Rudberg, by giving ·7947 as the specific gravity of anhydrous alcohol at 15° C. = 59° F. compared with water at 15° C. = 59° F., supposing this to be the maximum density of water,* although it was well known in his day, and long before it, that the maximum density of water was 4° C. = 39·2° F. All his voluminous tables are pervaded by these errors.

Stampfer, who appears to be a commonly accepted German authority, whose table is given in Hager's 'Untersuchungen,' and in this country in Hoffmann and Power's 'Examination of Medicinal Chemicals,' at p. 207, gives the specific gravity of absolute alcohol, at ·7951 at 15° C. = 59° F., compared with water at the same temperature. This, of course, is still more inaccurate than either Tralles or Gay-Lussac.

Tralles' tables are accepted and established by law in both Great Britain and in this country, and although the error amounts to just about a $\frac{1}{4}$ of one per cent. between Fownes, Drinkwater and Mendelejeff, who are practically in accord, and Tralles and Gay-Lussac, who are also practically in accord, this difference is accountable for the loss of millions of revenue. The British Government adopted the tables, and re-adopted them before the extent of the errors was fully recognized, and have simply adhered to them rather than suffer the inconvenience of changing them. But in this country they were adopted long after the better determinations were published, and, since it is now to be hoped that the tax on spirit here will soon be abandoned, it would be unwise to change.

In the writer's investigations he accepted the statements of Mendelejeff and others, that caustic lime was the best agent to use for dehydration, and that this agent leaves the alcohol quite unchanged in elementary composition. The improvements he has been able to make upon the methods of previous investigations have been chiefly: First, in starting with alcohol of much lower specific gravity than any before used, and in having this in great abundance for the desired modifications and repetitions of the process. Second, in having a mechanical shaker, driven by steam power, wherein two bottles of the capacity of 4 litres, or 1 gallon each, could be shaken at the rate of two hundred and forty vibrations a minute for any desired length of time, thus getting a better agitation and a more effective contact with the lime than has been previously practicable. Third, in filtering out all suspended lime before distillation, in an apparatus well supplied with desiccated air. Fourth, in distilling in a partial vacuum equal to 23 inches of mercury, thus reducing the boiling point to about 51° C. = 124° F., and freeing the distillate from dissolved air and other vapours, and from any traces of ethers or liquids of low boiling points. Fifth, by distilling under this partial vacuum directly into the specific gravity flasks. Sixth, by the use of special specific-gravity flasks of very large size, so as to reduce all errors of filling and weighing.

The thermometers used were graduated to ·2° C., and were read to less than ·1°, and were corrected by comparison with a standard instrument just before the observations were commenced, and as the investigation continued over nearly three months, they were twice re-compared during that time.

The balance used for the final determinations was examined and put in good order by Becker and Sons, for the weighings, and was sensitive to 5 milligrams when loaded to 500 grams with the flask and contents; and the weights were a new and accurate set obtained for the purpose.

The rougher determinations were made in a specific gravity flask of 500 grams capacity; but the finer determinations were made with two special flasks of better construction. One of these, chiefly used as a check upon the other, is of 100 grams capacity, and was used on a fine balance, sensitive to ·0001 gram when loaded, and with a different and very fine set of weights. The other flask has a capacity of 500 grams. In construction, it is simply an enormous thermometer of short range. The flask has a very carefully and accurately ground stopper of barometer tube, the tubular portion being about 8 centimetres or 3·2 inches long, and about 3 millimetres or $\frac{1}{8}$ inch bore. The upper prolongation of this is a very much larger tube of about the same length, and of nearly 2 centimetres or $\frac{3}{4}$ inch internal diameter, to receive the expanding liquid as the apparatus is warmed up to the temperature of the balance case before the weighings. The ground joint is lubricated and made entirely tight by a very small portion of pure soft paraffin, which does not alter the tare perceptibly. The calculations of specific gravity are very much simplified, and liabilities to errors reduced by having the capacity marks adjusted to 500 grams. There are three graduations on the tube, all for 500 grams of recently distilled and recently boiled pure water. Filled to the lower mark, the flask holds 500 grams of the water at its maximum density of 4° C. = 39·2° F. To the second mark it holds the same quantity, but at 15° C. = 59° F., and to the upper mark, the same weight, but at 15·6° C. = 60° F. These adjustments were all made in a bath continuously and vigorously stirred, and kept at the exact temperature by continuous additions of cold or warm water until the column in the tube ceased to rise or fall. In practice it was found that when the bath and the column had remained constant for about ten minutes, no change occurred by prolonging the time. A change of ·1° C. in the temperature of the bath was hardly perceptible when the flask was charged with water to the lower, or 4° mark, because water changes very little in volume when within a degree of its maximum density, but at both the upper marks a tenth of a degree change in the bath was easily seen, and reached its maximum in about ten minutes. When charged with alcohol, however, a tenth of a degree in the temperature of the bath gave a difference of more than a centimetre or $\frac{3}{8}$ inch in the height of the column, and the whole column was not long enough for a single degree. Thus changes in the alcohol could be easily read to the $\frac{1}{100}$ of a degree of temperature of the bath, and thus the errors of filling, and of form and size of meniscus are reduced far within the error of any balance in the weighings. This adjustment by corrected thermometer in the bath, and active stirring of the water, was not only used in adjusting the capacity marks with the standard distilled water, but also with the adjustment of the alcohol for each observation, and so well did it answer, that great confidence is felt in the results attained by it. A collar of lead is used which keeps the flask from floating in the bath.

It is very convenient to have that part of the tube in which the adjustments are made graduated in millimetres, so as to see better when the liquid ceases to rise or fall before the final adjustment to the mark.

For the adjustment of the alcohol to the marks—which, of course, is done while the flask is in the bath—a long and very fine pipette with a rubber tip is shown. Properly constructed and skilfully managed, this, after a little practice, will be sufficient to make the adjustment to the marks with great accuracy, but if a very little liquid is to be taken out, a narrow strip of bibulous paper is better. For working as rapidly as is practicable two baths are needed: one at the capacity temperature for adjustment of volume, and the other at the temperature of the balance case to warm or cool the flask before weighing.

As a counterbalance or tare for the specific gravity flask, the very clever device of Mr. Drinkwater was used,

* Quoted from Muspratt's 'Chemistry,' p. 123.

but was improved by sealing up the counterpoising flask at the time of adjustment. A flask of the same glass and the same capacity was so constructed that the closed stopper could be sealed in when made to accurately counterpoise the specific gravity flask on a fine balance, the counterpoisiug being done to within ½ a milligram. The stopper furnished at top with a ring and a hook of platinum wire, was then sealed in at the time of adjustment so that the contained air can never change either in volume or humidity, or weight, with any barometric or other changes. This is hung from the hook over the balance pan and leaves the pan clear for weights. By the use of such a counterpoise the error for buoyancy of air, or difference in density between the brass weights and the specific gravity flask and contents is very much reduced, so that being removed to the fifth decimal place, and the weighing being only to the fifth, the correction may be disregarded and omitted.

With such an arrangement and a little practice, six or seven very good determinations may be made in a day, at any of the three common standard temperatures to which the flask is adapted.

The common standard for alcohol in this country, obtained from the common usage in Great Britain, is to weigh it at 15·6° C.=60° F., compared with water at this same temperature as the standard volume for unity or 1·0000, and this is convenient, not only because the usage is so well established, but also because it is a true specific gravity, in that it is at once fairly accurate without correction for expansion of glass, as when the standard volume for unity is at a different temperature from the weighing. Nevertheless, water at 4° C. is a much better unity standard, and is rapidly becoming the universal one.

To economize time and space in what is to follow, whenever a specific gravity is given without giving the temperature or standard, it is to be understood as taken at 15·6° C.=60° F. compared with water at the same temperature, as unity. It is rather a curious coincidence which could hardly have escaped the notice of Tralles, had he taken his specific gravities himself, that the apparent specific gravity of an alcohol of ·79390 at 15° C.= 59° F., compared with water at 4° C.=39·2° F. is only about ·00002 less than the specific gravity of the same alcohol weighed at 15·6° C.=60° F., compared with water at 15·6° C.=60° F. as unity, this latter being ·79392.

The alcohol for the following determinations was prepared as follows:

Lumps of good caustic lime were ground to a coarse and fine powder, re-calcined at a bright red heat, and then, cooled in a close vessel, it was kept in bottles ready for the repeated dehydrations. About a ½ kilogram or 1·1 pounds of this lime was put into each of two bottles of the capacity of 4 litres or 1 gallon, and upon it was poured about 2 litres or ½ gallon of alcohol of a specific gravity of ·7939. These were well corked, put into the shaking machine and shaken at the rate of two hnndred and forty vibrations per minute until the contents became warm, or for about fifteen minutes—then allowed to cool, and then shaken again until the aggregate time in one day amounted to about two hours. This was repeated on the second day and on the third, and after settling over night the milk-like alcohol was drawn directly from the bottles without air contact into the distilling apparatus previously filled with dry air, by means of a Sprengel water pump.

(*To be continued.*)

ALKALI-PROOF VESSELS.*

BY PROFESSOR DITTMAR, F.R.S.

Preparative or analytical operations with caustic alkalies are beset with characteristic difficulties, which, although in a given case they may be of a purely financial nature, are none the less keenly felt. In the course of my laboratory practice I have made repeated attempts to turn these difficulties, and as one result, I have come, since about two years, to use basins of malleable nickel for operations with aqueous caustic alkalies. Nickel, until lately, was known in commerce only in the form of those "nickel-cubes" which, although they might contain as much as 99·5 per cent. of the pure metal, were always utterly devoid of plasticity: they broke under the hammer. That this brittleness is not an inherent property of the metal had long been proved by A. Richter, who, in an early decade of this century had obtained the metal in a form in which it was highly malleable and ductile. Yet malleable nickel remained unknown to the arts until Fleitmann, in 1879, made a remarkable discovery. Finding that even the purest nickel which he was able to produce in his works yielded unworkable ingots, he suspected that the brittleness of the metal was owing to the presence in it of occluded carbonic oxide. He accordingly tried the effect of fusing it up with a small proportion of magnesium, and found that as little as one-eighth per cent. of this addition cured the defect, and imparted to the regulus such a high degree of plasticity that it could be rolled into the thinest sheet and drawn into very fine wire. He also found that nickel at a red heat can be welded together with iron or steel, and that a compound plate thus produced stands rolling out to any extent without breach of continuity. Since this discovery Mr. Fleitmann's firm have made a business of the production of kitchen utensils, which are nickel inside and outside, with a core of iron between the two. These utensils, as you see by the specimen I exhibit, are almost as pretty as silver ones, and practically as little given to spontaneous oxidation as these. Over copper vessels they offer the advantages of being harder and absolutely innocuous. When I read Dr. Fleitmann's publication it at once struck me that basins made of malleable nickel would be the very thing for operations with caustic alkali leys, and I caused a Glasgow silversmith to procure a supply of Fleitmann's metal and try to make it into a basin for me. My friend was not successful; the metal, although malleable at first, became stiff and intractable under the hammer. A few yea·s later, when the idea again turned up in my mind, I applied to Messrs. Johnson, Matthey, and Company, of London, and they, after one or two failures, succeeded in producing this little basin (exhibited), which since has been used by my students hundreds of times, chiefly for the separation of iron and alumina. The basin, as I hardly need say, was not always very tenderly handled, and yet, as you see, it has quite retained its original shape, and almost its original polish. This large basin (pointing to another exhibit), which boils a litre of liquid, was procured from the same firm about eight months ago. It looks as if it came straight out of the workshop, although it has been used many a time for preparative purposes. The metal of these basins, in regard to its power of resisting the action of caustic alkali ley, is quite at a par with platinum; and it is certainly more convenient (apart from its being far cheaper) than silver; it has a greater permanence of form, is quite devoid of porosity (which fine silver is not), and does not conduct heat so inconveniently well. A nickel basin half-full of boiling caustic potash ley can be handled with the naked fingers with impunity. In the present connection the only inconvenience of these nickel vessels is that, for instance, a patch of oxide of iron which may stick to the basin must be removed mechanically, because the metal is attacked by aqueous acids, although it is dissolved far more slowly than iron is. It must also be stated that nickel basins do not stand ammonia, in the presence of air at least. That nickel basins would be proof against *fused* caustic alkali I never expected, but I was curious to ascertain what strength a caustic alkali ley must have attained before it begins to attack the metal. A solution of commercial caustic potash, con-

* From the *Journal of the Society of Chemical Industry*, May 29.

taining 44 per cent. of real KHO was kept in a nickel basin over a hot water-bath for over two hours, and then allowed to stand in the basin cold over night. From the loss of weight which the solution had suffered by evaporation, the finally present percentage of pure KHO was calculated to be=59·6. Yet the basin had remained bright, and lost only two milligrammes of its weight. A second experiment was made with a stronger solution of caustic potash, which was kept in gentle ebullition by means of a gas lamp, the water lost by evaporation being replaced from time to time, judging by the eye. Time of exposure, this time, about one hour; original strength= 58·8 per cent. of pure KHO; final strength (contrary to intention) greater, namely, =68·6 per cent. The basin had lost 10 milligrammes, from an exposed area of about 90 square centimetres, and the ley contained a trace of dissolved nickel. The limit of safety seems to lie somewhere near 60 per cent. of real KHO. This second experiment was repeated with a caustic soda (instead of a potash) ley. The concentration rose from 58·5 per cent. to (finally) 61·5 per cent. of real NaHO. The basin was slightly but perceptibly attacked; it had lost 4·5 milligrammes in weight. To pass now from the aqueous to the dry reagents. Caustic alkali, when in a state of fiery fusion, as we all know, attacks even platinum very badly. Of ordinary metals, in fact, only *gold* is quite proof against its powerfully corrosive action.* But gold is very expensive, and, what is worse, very soft. Chemists, therefore, generally try to get on as well as they can with fine silver, although this metal, as we know, is not quite proof against the fused reagent, and besides is inconveniently soft and porous. It sucks in fused caustic alkali like a sponge. Even a small silver crucible, after having been used for a caustic alkali fusion, and carefully cleaned, always weighs quite a number of milligrammes more than it did originally. I once had a silver crucible which, although perfectly water-tight, allowed fused caustic potash to slowly filter through its walls. Some six years ago I tried to remedy these defects by alloying the metal with a little nickel; but I found (as Lampadius had done fifty years before) that silver refuses to amalgamate with nickel. But learning from the same authority that nickel readily unites with gold, I made a gold nickel alloy, and added an excess of it to a relatively large mass of molten silver, There resulted an alloy which had at any rate the expected degree of hardness and elasticity, and Messrs. Johnson, Matthey and Company had no difficulty in bringing it into the form of a boat for me. This boat has served during the last six years for numerous determinations of organic nitrogen in water residues according to that method which Mr. Robinson and myself published conjointly some years ago, and has been found to hold out far better than, presumably, a plain silver one would have done. This means that it was not attacked by many fusions in it of a mixture of caustic baryta and caustic soda, carried out, however, in an atmosphere of hydrogen. The boat would be in use this day if I had not cut it up some time ago to ascertain its quantitative composition, which was found to be as follows—

Silver	91 per cent.
Gold	7 per cent.
Nickel	2 per cent.
	100

With this receipt in their hands, Messrs. Johnson, Matthey and Company made for me a new boat, and a crucible of the alloy. (Exhibited.) My main object in ordering the new articles was to compare the alloy in regard to resistance to fused alkali with pure silver; but when I was once at it I thought I might as well extend my inquiry to nickel and platinum, and did so. At first sight it appears rather singular that all ordinary metals are attacked by fused caustic alkali, although only a few, namely, tin, zinc, and aluminium, have the power of decomposing its water with evolution of hydrogen and formation of an alkaline metallate. This very forcibly suggests that, in the case of other metals than these three, the corrosive effect is due not to the alkali in itself but to the peroxide formed from it by the action of the atmospheric oxygen. When we fuse an ounce of caustic soda in an iron crucible it gets hopelessly contaminated with oxide of iron. The manufacturer, on the other hand, fuses his 10 tons in an iron pot, and produces a snow-white preparation, because in his case the proportion of peroxide produced, as far as it comes into contact with the iron, is vanishingly small. These considerations guided me in my experiments, which, as a rule, consisted in this, that the respective metal was used in the form of a boat, which, after having been charged with the reagent, was placed in a combustion tube and heated to redness, sometimes in a current of air, sometimes in a current of hydrogen. In the case of the air experiments, a crucible was used occasionally instead of a boat, and, in the special case of platinum, part of the hydrogen trials even were carried out within a crucible provided with an inlet and an outlet tube, soldered, autogynically into the well-fitting lid. (Crucible exhibited.) The most important result of my experiments is that the metals examined, namely, silver, the silver-nickel-gold alloy, platinum, and nickel, at even a red heat, are all proof against fused caustic potash, soda, and baryta (BaO_2H_2) *in the absence of air*. Hence if we want to disintegrate, say, a silicate by fusion with caustic potash or caustic baryta, we may use a platinum crucible, and consequently apply a bright red heat, if we only take care to maintain in the crucible an atmosphere of hydrogen. By means of the crucible which I exhibit I have had no difficulty in decomposing felspar with caustic baryta, so that the "fuse" could have been analysed for potash and soda as well as for the rest of the components. I have not made any such direct trials with caustic potash or soda as a reagent, but am in a position to state that the alkalies, when kept red hot in an atmosphere of hydrogen, fuse quietly, while in the presence of air they boil up and are apt to run over the edge of the vessel. In cases where an atmosphere of hydrogen would be objectionable, as for instance in the case of tin-stone, nitrogen might be substituted for the more volatile gas, and, I have no doubt, would work as well or better. A crucible intended for such alkali fusions, however, should have a shorter outlet pipe than the one which I exhibit, and which, as I may remark in passing, was originally intended for work of an entirely different order. By the conjoint action, at a red heat, of fused alkali and air, all my metals were attacked, silver not excepted, although it must be admitted that it held out best, and appreciably better than even my triple alloy. But whichever of the metals was used, caustic potash always acted more powerfully than caustic soda. Caustic baryta, as far as my experience goes, is a stronger corroder certainly than caustic soda, and not necessarily milder in its action than caustic potash. On silver more especially it seems to act rather more energetically than potash does. To illustrate these general statements I will quote a few examples. The alloy crucible was charged with 19 grams of pure caustic potash, and the reagent fused and kept at a red heat for some twenty minutes. After the surplus water had boiled off the liquid became black, probably through the decomposition of organic matter contained in the reagent,* because the colour disappeared after a time. But the black colour subsequently returned, and became more and more intense through the action of the peroxide formed on the metal. The fuse, when dissolved in water, gave off a gas (probably oxygen) and yielded an abundant black precipitate containing (by analysis) 47 milligrammes of silver (Ag.) and 3·4 milligrammes of nickel. The crucible had lost

* To make sure of the correctness of this general assumption, I fused caustic potash in a tray made of pure gold foil, and kept up a bright red heat for a considerable time. The gold remained perfectly bright.

* It was "potasse à l'alcool."

57·5 milligrammes of its weight. A fine silver basin when subjected similarly to the action of 26 grams of the same potash (at a somewhat lower temperature) behaved similarly to the alloy crucible; only, apparently, it did not yield so readily to the reagent. Yet the fuse, when treated with water, gave off gas and yielded a residue weighing 69 milligrammes, and containing, by analysis, 58 milligrammes of metallic silver. The basin lost only 6 milligrammes of its weight, showing that it had sucked in caustic alkali. The alloy crucible, when treated with 9 grams of caustic *soda* at a red heat for thirty minutes, lost only 1½ milligrammes of its weight. The fuse dissolved in water with only a slight gas evolution, and formation of a small black precipitate. The silver basin, under similar circumstances, behaved pretty much the same way, but it gained 7·5 milligrammes in weight, proving absorption of soda by its porous metal. A small fine silver basin (of about 35 millimetres diameter and 17 millimetres deep), when subjected to the action of caustic baryta, kept fused in it at a red heat, was strongly attacked, and yet, after having been cleaned, weighed 32 milligrammes more than before. In connection with the present subject one cannot help remembering the conflicting statements of different authorities in regard to the action on platinum of fused lithia. Since the time of Arfvedson, not merely lithia proper but even lithium compounds generally had been credited with quite a characteristically strong corrosive action on platinum at a red heat, until Troost made it out that lithia does not attack platinum unless it be contaminated with rubidia or cæsia, as it very often is in practice. As the proposition bears the stamp of such a distinguished name I felt inclined to accept it as correct, the more so as a few incidental laboratory experiences of my own rather tended to confirm it; but I did not feel quite sure, and accordingly inquired into the matter experimentally. To procure a lithia sure to be free from potash, rubidia, and cæsia, I dissolved a supply of *Lithium carbonicum purum* from Trommsdorff in Erfurt, in hydrochloric acid, and after addition of an ample excess* of chloride of platinum evaporated to dryness on a water bath. The residue was taken up with a mixture of equal volumes of absolute alcohol and absolute ether, the liquor filtered off from the chloroplatinate produced, freed from its ether and part of the alcohol by distillation, and then evaporated to dryness. The residue was reduced in hydrogen at about 300° C., and then dissolved in ether alcohol to remove the platinum and incidentally what there might be of chloride of sodium. This led to a chloride of lithium, which, although not sure to be quite free from sodium, could not have contained any of the more basilous alkali metals. To convert it into carbonate, without the use of fixed alkali, I evaporated it with a solution of the calculated weight of alkali-free oxalic acid to produce the acid oxalate, which was found to crystallize very readily. Rejecting the mother-liquor, I decomposed the crystals at the lowest possible temperature in a platinum basin, which, to my surprise, led to the formation of a large proportion of charcoal,† to which circumstance it may be owing that the platinum remained unattacked. The residual mixture of carbonate and charcoal was ground up with water, and carbonic acid passed into the mixture to produce a solution of bicarbonate, which was filtered and decomposed by evaporation on a water-bath, so that the bulk of the dissolved carbonate was obtained in the shape of a crystalline crust. This crust was collected, rinsed with water, and accepted as pure carbonate of lithia Li_2CO_3. Part of this carbonate was converted into lithia by the ordinary process of causticizing with lime, the process being conducted in the large nickel basin, by means of pure lime made by igniting pure precipitated carbonate in a platinum crucible. The decanted lithia ley was evaporated down in a large platinum basin, when a deal of carbonate of lime or $Ca(OH)_2$? separated out, which was allowed to settle and eliminated by renewed decantation. The thus purified liquor was then evaporated further in a silver basin, the dry residue fused, and preserved as lithia. It turned out a poor apology for real LiOH, as shown by the following analysis:—

	Per cent.
Lithia (Li_2O)	56·53
Carbonic acid (CO_2)	5·57
Lime (CaO)	5·13
Water (by difference)	32·77
	100·00

the composition of a mixture of the formula—

$$0{\cdot}966\ Li_2OH_2O + 0{\cdot}0152\ Li_2O + 0{\cdot}0186\ Li_2CO_3 + 0{\cdot}0486\ CaCO_3$$

Both preparations acted strongly on platinum vessels when fused in them in the presence of air, and there did not seem to be much difference between the two in regard to the violence of their action. I content myself with quoting an experiment made with the carbonate in a platinum crucible of about 15 c.c. capacity. A quantity of the carbonate was placed in the crucible, and at first heated gently for a time to drive off any water or excess of carbonic acid. The residual dry carbonate (Li_2CO_3?) amounted to 4·413 grams. The heat then was raised to and maintained at full redness for about an hour and a half, the lid being kept on. The fused carbonate crept up at the sides of the crucible, so that some, by travelling along the lid, reached the frame and coloured it crimson. The crucible, especially at those parts of the side which were only, so to say, varnished over with the reagent, was very perceptibly attacked. To increase the effect, a coil of platinum foil was now placed in the crucible, the lid put "half on," and the heating resumed and continued for other two hours. The crucible and contents were now allowed to cool, and weighed, when it was found that the contents weighed 0·161 gram less than the original carbonate. All the visible inside of the crucible had assumed a dark olive-green colour. To analyse the product the crucible with its contents was placed in a cylinder rigged up as part of an apparatus for the direct determination of carbonic acid. In it the product was decomposed by dilute sulphuric acid, the carbonic acid collected in a potash bulb and soda-lime tube and weighed. An aliquot part of the solution left served for the determination of the lithia as sulphate.

Results.

	Grams.
Original carbonate	4·413
Total residue in crucible at the end of the heating	4·252
Containing CO_2	2·313
And lithia equal to Li_2SO_4	6·543

This agrees with the assumption that the residue was a mixture containing

	Parts.
Carbonate of lithia (Li_2CO_3)	91·49
Binoxide of lithium (Li_2O_2)	7·49
Extra oxygen (by difference)	1·02
	100·00

The crucible and coil, after the sulphuric acid treatment, were washed with water, dried, and weighed. They had gained 22 milligrammes, which happens to be just about one-half of the "extra oxygen" reported, as it is when reduced to absolute weight. But this latter quantity is burdened with the observational errors in the determination of the carbonic acid and lithia and the total substance, and consequently affords no safe ground for further conclusions. In an atmosphere of hydrogen neither of the two lithia preparations attacked platinum in the least, even when kept in contact with it for hours at a red heat;

* "Excess" to be taken in reference to the non-lithium presumably present.

† The oxalic acid had been prepared by the decomposition of oxalate of methyl by water, and may have contained methyl-oxalic acid.

but both lost weight to quite an unexpected extent, although the amount of lithia volatilized seemed to have been small in all cases.

In the case of the carbonate the change was more minutely studied. A small platinum crucible, containing 4·219 grams of carbonate of lithia (recently dehydrated in it at a gentle heat), was placed in the platinum crucible, provided with inlet and outlet tubes, and heated within it for many hours over a good Iserlohn burner,* while a current of dry hydrogen passed through the apparatus to keep out the air. From time to time the heating was stopped, and the residue examined and weighed. There always was a small sublimate on the inside of the lid of the outer crucible, which was weighed, to be allowed for in the calculation of the loss of volatile matter up to the respective time, and removed before the process was resumed. The corrected loss was very considerable in the earlier periods of heating, but became less and less as the process progressed. It was also noticed that the substance while losing carbonic acid became more and more difficultly fusible. Calculating from the weights of the successive residues and sublimates obtained, and on the assumption that the aggregate (duly corrected) loss was just carbonic acid (lost and not replaced by water), the ultimate residue was very nearly of the composition $Li_2O + \frac{1}{10}CO_2$. A determination of the carbonic acid (by the direct method) and of the lithia (as Li_2SO_4) gave the following results:—

Lithia (Li_2O)	88·27 ÷ 30 = 2·942
Carbonic acid (CO_2) . . .	7·50 ÷ 44 = 0·171
Water (? by difference) . .	4·23 ÷ 18 = 0·235
	100·00

These numbers agree with the formula—

$$Li_2O + 0{\cdot}13(H_2O \text{ or } CO_2)$$

Part of this product was utilized for studying its action on platinum in the presence of air. But as a number of days had elapsed before this could be done, and the substance meanwhile had been standing in the crucible (within an exsiccator), we first re-heated it in hydrogen gas within the same platinum apparatus as had been used before, with this difference, however, that after thirty minutes' application of an Iserlohn burner the heating was continued for twenty minutes over a gas blowpipe. Weight of substance operated upon equal 0·4692 gram; total loss equal 79 milligrammes, which is (by 24m.grams) more than the weight of ($CO_2 + H_2O$) calculated for 0·4692 gram of $Li_2O + 0{\cdot}13$ (H_2O or CO_2), showing that the substance while in the exsiccator had absorbed water or carbonic acid. But obviously the substance by being re-heated had come still closer in its composition to plain Li_2O. It had assumed a grey colour, and showed only signs of incipient fusion. This grey substance was now heated within the same apparatus, in a current of dry air, a gas blowpipe supplying the heat. As part of the substance was lost accidentally, the residue was not weighed. It was now of a perfectly white colour, although the empty part of the crucible, through the conjoint action of the air and the vapour of lithia produced, had got badly attacked. This residue again stood in an exsiccator for some days before we had time to analyse it. To remove any absorbed water or carbonic acid we began by re-heating it in hydrogen. 0·347 gram of the re-heated substance, when subjected to the action of water, dissolved only very slowly, with evolution of very little heat. Without waiting for a complete solution we added excess of sulphuric acid, evaporated to dryness, and weighed the sulphate. It amounted to 1·2459 gram corresponding to 97·9 per cent. of Li_2O in the substance analysed. To sum up: Carbonate of lithia, when ignited in a platinum crucible in air, attacks the metal, and is itself largely converted into peroxide. A considerable percentage, however, of Li_2CO_3 remains as such. When it is heated in hydrogen it does not attack the metal, but gradually loses more and more of its carbonic acid, so that at last almost pure Li_2O is left as an almost infusible solid, which acts only very slowly on water; and consequently is widely different from what the oxides K_2O and Na_2O are supposed to be. (I have no personal experience regarding these myself.) In order to see whether the hydrogen in reducing the carbonate, acts chemically, perhaps by removing the CO_2 as CO and H_2O, or merely as a supporter of dissociation—*i.e.*, by preventing accumulation of carbonic acid within the cruicible's atmosphere—a known weight of carbonate of lithia was heated (within the same platinum apparatus as had served in the hydrogen experiments) in a current of dry nitrogen gas. But as our stock of specially purified carbonate of lithia was exhausted, we operated upon commercial *Lithia carb. puriss.*, as obtained from Trommsdorff. The following weighings were recorded:—

	Grams.
Original substance	0·7227
After preliminary dehydration at a gentle heat in nitrogen gas . . .	0·7180
Heated over blowpipe for 15 minutes.	

The out-going nitrogen, when blown through a flame, coloured it strongly red. Neglecting this loss of Li_2O, and assuming the 0·239 gram, which the 0·7180 of Li_2CO_3 had lost, to be all carbonic acid, it represents 33·40 out of the 59·46 per cent. of CO_2 present in the original carbonate. The platinum remained unattacked. The heating in nitrogen was resumed, but the experiment miscarried, which is of no consequence, because the result already obtained clearly proved that we have to deal with dissociation pure and simple. I intend to inquire more fully into the behaviour of Li_2CO_3 and of LiOH when heated in hydrogen or other gases, and to extend my inquiry to the potassium, sodium, and barium compounds.

In conclusion, it is an agreeable duty to me to acknowledge the very able and zealous manner in which I was supported by Mr. Robert Anderson in the execution of the many experiments involved in this investigation.

* A powerful Bunsen, constructed on the Argand principle.

SODIO-BISMUTH CITROPYROBORATE.*

BY R. ROTHER.

Most of the normal salts of bismuth are either insoluble in water or decomposed by it into insoluble bismuthyl or oxysalts and free acid. Certain bismuth and bismuthyl double salts of various organic acids are extremely soluble in water without decomposition. Alkalies in moderate excess do not disturb these solutions, but most acids destroy the soluble compound and precipitate insoluble normal salts of the organic acids. This behaviour is a great obstacle to the formation of permanent acidulated solutions, The generality of galenical preparations of which bismuth is a component usually contained it as ammonio-citrate. The combinations are always permanent when alkaline or if acid when ferrated. All elixirs containing bismuth when in the least acidulated inevitably separate bismuth citrate in crystalline crusts on standing a short time. The peculiar and popular combinations of bismuth and pepsin when acid are sure to precipitate the bismuth salt and when alkaline to injure the pepsin. The writer in attempting to find a suitable compound of bismuth which could bear moderate acidulation and remain dissolved, believed that the sodio-bismuth pyrophosphate would be such a salt, and that it might admit of permanent association with pyrophosphoric acid. No success attending this experiment, the writer next resorted to a trial of various acids in connection with the prevalent bismuth ammonio-citrate. It was found that boric acid did not decompose this salt, and hence a desideratum is thus obtained in the stability of a solution containing free boric acid. This result led the writer to treat bismuth citrate with borax direct, thereby aiming at a similar and definite sodium compound. The experiment showed that the two salts unite in the proportion of one

* From the *American Journal of Pharmacy*, June.

m. of each. This indicates a secondary double salt constituted thus :

$$\begin{array}{l} Bi - B_4O_7 \\ \| \quad | \\ Ci - Na_2 \end{array}$$

That is a sodio-bismuth citropyroborate. It is a remarkable point in the formation of this salt that the chemically and optically neutral bismuth citrate in combining with the chemically neutral but optically alkaline sodium pyroborate produces a chemically neutral but optically decidedly acid compound. This is a colourless amorphous, very soluble non-deliquescent salt. It is insoluble in alcohol but miscible with water in all large proportions without decomposition. It has a faint saline, slightly metallic but not unpleasant taste. The solution of this salt is not disturbed by the presence of neutral chlorides. Most acids excepting boric acid decompose it at once and precipitate a bulky and gelatinous compound of bismuth and boric acid. This precipitate is insoluble in a moderate excess of acid but dissolves readily in a solution of borax. In the presence of excess of borax no precipitate is formed by the usual acids unless these predominate; citric acid, however, causes a separation of crystalline bismuth citrate.

When the solution of the salt is evaporated to a thin syrupy consistence it becomes slightly turbid on cooling and deposits a large amount of colourless crystals. On spontaneous evaporation the remaining solution yields a considerable quantity of small white crystals. By adding water to the whole residue the colourless crystals rapidly disintegrate and an augmentation of the white crystals occurs. The application of heat in the presence of this small quantity of water does not reproduce the clear solution. But the addition of water in about five times the weight of the residue and subsequent heating promptly effects a clear solution by a reconstitution of the original salt. When, however, the solution of the salt is evaporated at a uniform temperature to a dense syrupy consistence an amorphous beautiful scaled residue remains which resembles in appearance the official ammonio-citrate of bismuth. A small quantity of water again decomposes it into its primary factors, the bismuth citrate and sodium pyroborate. The former appears as white, insoluble crystals, whilst the latter is readily recognized by its taste. It appears therefore that the new salt is a scaled amorphous compound which is permanent in the absence of water and equally permanent in any large proportion of water, but is readily and completely decomposed by a comparatively small quantity of water. In its production in the solid form some care is necessary, during the later stage of the evaporation, not to let the temperature sink, as this partial cooling in contact with the modicum of water causes a decomposition and consequent turbidity which subsequent heating does not correct.

The following formula yields it with the greatest ease:

Bismuth citrate	399 parts.
Sodium pyroborate, in powder . .	382 parts.
Water sufficient.	

Mix the citrate and borax with 2400 parts of water and apply heat until the citrate is all dissolved. Then filter the solution after having diluted it with its volume of water and evaporate it at a uniform temperature to a dense syrupy consistence and spread it on plates of glass or porcelain so that on cooling the salt may be obtained in scales.

The writer has made no decisive experiments in relation to the action of this salt on solutions of pepsin. When a solution of pepsin prepared with chlorhydric acid is first carefully neutralized with sodium bicarbonate or treated with a slight excess of borax the bismuth solution produces a faint flocculent precipitate, not however proportionate to the amount of pepsin present. The character of the precipitate was not ascertained. Bismuth citrate also forms a soluble combination with sodium pyrophosphate, but the writer has not further examined it.

In conclusion it may be said that when borax is heated with bismuthyl nitrate decomposition ensues, but the resulting compound is insoluble in excess of borax. This shows that a sodio-bismuth pyroborate cannot be formed. Some time since the writer attempted to prepare bismuth salicylate by heating bismuthyl nitrate with sodium salicylate. Perfect decomposition could not be attained, and the writer then heated the nitrate with salicylic acid. A very surprising result followed this experiment. Combination speedily occurred and a readily fusible brown-red crystalline mass was formed. Stronger acids liberated from this a brown-red, peculiarly odorous acid which, without further examination, appeared to be one or more of the three nitro-salicylic acids. This result is in so far remarkable that it easily effects the generation of nitro-acids which ordinarily can only be produced by the direct intervention of very concentrated nitric acid at a high heat.

THE NOMENCLATURE OF THE ALKALOIDS OF ATROPA BELLADONNA AND DATURA STRAMONIUM.*

BY E. SCHMIDT.

The author, having received several inquiries from physicians and others as to what substance was to be understood under the term "daturine," and in what it differed from atropine, answers the question in this paper upon the basis of the investigations carried on by himself and by Ladenburg. He points out that in those investigations it was ascertained by different methods that the two alkaloids, atropine and hyoscyamine, are contained in *Atropa Belladonna* as well as in *Datura Stramonium*. The experiments of the author showed that in both plants the principal part of this alkaloidal mixture consists of atropine, having a melting point of 115°–115·5° C., the quantity of hyoscyamine remaining in the mother-liquor after the crystallization of the atropine being considerably smaller. According to the author's experience the yield of "daturine," which name is used to describe the basic mixture isolated from *Datura Stramonium*, varies very considerably according to the quality of the seed. For instance, four samples of thorn-apple seed from different sources yielded from 5 kilos respectively 12·5, 18·4, 2·6 and 10·2 grams of yellowish-white crude "daturine." From 50 to 70 per cent. of this crude daturine consisted of pure atropine melting at 115°–115·5° C. Moreover, a preparation of crude "daturine" received from Herr Trommsdorff, of Erfurt, from which a first crystallization had been removed, yielded still nearly 45 per cent. of pure atropine. Similar relations were also observed in the crude "atropine" from belladonna root. Ten grams of crude "atropine" prepared by the author yielded in repeated spontaneous evaporation of its solution in alcohol between five and six grams of shining acicular crystals of atropine, melting at 115°–115·5° C. Similarly ten grams of crude "atropine," supplied by Herr Trommsdorff, contained rather over six grams of pure atropine. It appeared probable that the mother-liquors still contained considerable quantities of atropine, probably hindered from crystallizing by the admixture of other bases, and in this respect no essential difference was observed between the mother-liquors of crude 'atropine" and those of crude "daturine."

In the crude mixtures from belladonna root and thorn-apple seed examined by the author, and mostly prepared by him, the larger proportion of each sample consisted, as mentioned above, of atropine. The remaining and smaller portion, which was much more difficult to crystallize, consisted of hyoscyamine and probably other bases, and their decomposition products. The relative proportions would appear, however, not to be constant, otherwise it would be difficult to reconcile with this experience Ladenburg's statement that in *Datura Stramonium* he found the light alkaloid, hyoscyamine, to preponderate. The

* Form the *Archiv der Pharmacie*, xxii., 329.

author mentions that under both the names "atropine" and "daturine" he has met in commerce with beautifully crystallized specimens of alkaloid that proved to be chemically and physically identical.

As therefore the investigation of Ladenburg does not, any more than that of the author, connect the name "daturine" with a particular chemical individuality, the author thinks it desirable, in order to avoid doubt and error, that this name should be dropped out from chemical literature and prices current, and that the alkaloids should be described by the names agreeing with their chemical characters. Consequently, leaving out of the question hyoscine, which Ladenburg found in the henbane together with hyoscyamine, Herr Schmidt would provisionally characterize only two plant bases having a mydriatic action: atropine, melting at 115°–115·5° C., and hyoscyamine, melting at 108·5° C. Duboisine is, according to Ladenburg, in the pure condition, identical with hyoscyamine, and the belladonnine of Hubschmann and of Kraut is probably a mixture of atropine with oxyatropine (Ladenburg and Roth). Should it be desired to differentiate between chemically identical atropine according to its origin, it would be simply to make a distinction between an atropine from *Atropa Belladonna* and one from *Datura Stramonium*, but not between atropine and daturine.

MICROSCOPICAL EXAMINATION OF MALT.*

BY GRACE LEE BARB, PH.G.

The process of malting barley is very simple in theory, but in practice requires a great deal of care, and constant attention. The barley must be carefully selected—this is the work of an expert—and then "steeped." For this purpose it is placed in wooden vats, covered with cold water, and allowed to stand several days. Some maltsters consider this operation complete when the grain is soft enough to be pierced by a needle; others, when it can be crushed between the fingers. The operation is carried too far when the contents of the vats become milky. During this time the barley absorbs from 50 to 60 per cent. of water, which is necessary in the following operations. The unabsorbed water is then drawn off from the vats, and the softened barley is placed in couches upon the floor of the malting house. Germination now begins; the radicles appear, and the acrospires develop; at the same time moisture is given off; hence this stage of the operation is sometimes called the "sweating." Were this allowed to proceed the albumen of the seed would be used for the development of the radicles and plumules, and the desired object—the conversion of the starch into maltose, or sugar—would be lost. To prevent further development the temperature is reduced by spreading out the couches, repeatedly turning, and scattering over a constantly increasing surface. When the process has been carried as far as desired, which is generally considered to be when the acrospire has grown to two-thirds the length of the grain, it is stopped completely by kiln-drying. This is done in a large room with a brick or tile floor which is heated by steam. Here the barley is finished by being perfectly dried, and this product constitutes the officinal malt.

Much depends upon the temperature used in this last operation; if the heat is sufficient to scorch it, it is ruined as malt, but is used for colouring porter, etc. When the temperature varies from 90° to 100° F., pale malt results; this is the kind required by the Pharmacopœia.

The barley grain is elliptical in shape; its principal part is the farinaceous matter, as the embryo occupies but a small indenture at one end and on the outside. On the opposite side from the embryo, running lengthwise, is a gradually broadening groove. Closely adhering to the endosperm is the pericarp, and outside of this is the so-called husk. Both the pericarp and the husk are smooth and continuous over the embryo, and terminate in the groove.

A transverse section through the barley grain shows the thin-walled parenchyma radiating from the groove, and on the outer edge two or three rows of gluten cells: beyond these are the tabulated cells of the husk, in which is deposited a large amount of silica; between these is seen a brown line of indefinite structure, which forms the pericarp. The gluten cells extend around the grain, but as the pericarp descends into the groove they are obliterated.

The simple theory of malting is that in the presence of moisture absorbed during the steeping operation, and with a certain amount of heat, the diastase which is developed during germination converts the starch into a fermentable sugar called maltose. As the malting process advances, the proportion of starch diminishes, while that of the sugar increases. It was thought that it might be possible to study this change of starch into sugar microscopically, not expecting that the sugar could be distinguished under the microscope, but that the disappearance of the starch granules could be gradually traced, and the indications thus gained would be of practical service by definitely settling the period of time necessary for the transformation of the starch.

With the hope of determining when there was the greatest change in number and appearance of the starch granules, transverse sections of the barley grain have been made, and also of the barley in its different stages of malting, from the steeped down through the series, even including that which had been exposed ten days. The following results have been obtained: The starch granules of the barley vary in size and shape; some of them are very minute and globular, while others are much larger and have much the same elliptical shape as the barley grain itself. A line which resembles the groove in the barley grain extends the entire length of the starch granule.

The greatest change seems to take place in the minute globular starch granules, as on the tenth day these have to a great extent disappeared, and in some specimens are entirely wanting. On the tenth day there are still found some of the larger elliptical starch granules, and, although their number has decreased, the relative size of the residue has apparently increased. The radiating structure which has already been mentioned as being characteristic of the barley grain is not as distinct in the steeped grain, and can with difficulty be traced in the first day. In these two the starch granules do not appear to be materially changed. In the third day malt the whole structure of the barley grain seems to be expanded; the smaller starch granules become more scattered, and an increase in the size of the elliptical starch granules is noticed. This latter change gradually increases in the fourth, fifth and sixth days' malt, being greatest along the groove, and thence radiating out towards the margin. In the seventh day malt there seems to be the greatest change; the elliptical granules are still observed to be larger, but are now very few in number. The appearance of the eighth and ninth days' malt is not essentially different from that of the seventh day's malt. In the tenth day malt the majority of the grains show a very few elliptical shaped starch granules, and the smaller granules are now replaced by globular masses, the nature of which has not been determined.

In conclusion, the results of the labour spent in this direction indicate that, with sufficient practical experience, the difference between malt which has been subjected to different degrees of exposure upon the floor could be readily detected. It is to be hoped that the subject of the microscopical determination of the value of malt may hereafter be carried out with valuable developments.

* From the *American Journal of Pharmacy*, June.

The Pharmaceutical Journal.

SATURDAY, JULY 12, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelop s indorsed "Pharm. Journ."*

THE FUTURE OF THE SODA INDUSTRY.

WHEN the members of the Society of Chemical Industry met in the Theatre of the Newcastle Literary and Philosophical Society on Wednesday last, under the presidency of Mr. WALTER WELDON, there was no doubt a general expectation prevalent amongst them that whichever of the topics connected with applied chemistry might be chosen by the eloquent chairman as the theme of his address, there was undoubtedly a rich intellectual feast in store for them. Nor was the expectation disappointed; for although the subject selected,—the future of the soda industry,—was one exhaustively treated by the same speaker only about a year and a half since, the address was listened to with unabated attention from the first sentence to the last. Of course in Newcastle-on-Tyne, the first and chief English home of the LEBLANC process, if anywhere, the topic was capable of arousing interest; but its enjoyment, or the effect it produced, will not be confined to one locality. As a record of the triumphs of perseverance, skill, and ingenuity over what only a short time since appeared to be almost insuperable difficulties it is very remarkable. It tells not only of the great changes in the alkali trade which were the possibilities of eighteen months ago having become the realities of to-day, but it points to others looming up in the near future which threaten to set up still greater innovations, if indeed they do not virtually put an end to the manufacture of carbonate of soda by the LEBLANC process altogether. Starting with the admission that—through an arrangement for limiting the production of alkali, and thus affecting the price of bleaching powder—the makers of soda by this process are once more able to make both ends meet financially, Mr. WELDON pointed out that even this was due to the fact that it remains practically the only process for the production of the raw material of chlorine, and that its only claim to continue to live will depend on it contuining the main source of hydrochloric acid. The greater part of the address was therefore devoted to a discussion of the probability of this state of things proving to be permanent.

Referring first to the probability that the chlorine of the salt decomposed in the ammonia process, which is at present thrown away as calcium chloride, will eventually be obtained in a useful form, Mr. WELDON alluded to a process patented by Mr. MOND, in which, instead of the residual ammonium chloride being decomposed by lime and the chlorine wasted, it is by treatment with sulphuric acid converted into acid ammonium sulphate and the chlorine liberated; but the locking up of so much ammonia in a product for which there exists no sufficient demand renders this process at present impracticable. Another modification of the ammonia process in which sodium sulphate, produced by the ordinary process, instead of sodium carbonate, would be the material operated on with ammonia was dismissed as cumbersome. But one invented by Messrs. CAREY, GASKELL and HURTER, in which sodium sulphate and hydrochloric acid are obtained by the reaction of acid sodium sulphate upon sodium chloride, the sodium sulphate being decomposed by acid ammonium carbonate to form acid sodium carbonate and ammonium sulphate, and the last-mentioned treated so as to regenerate ammonia and acid sodium sulphate for a fresh operation, was spoken of as promising very advantageous results. But even before this process has obtained a footing it is confronted by a rival, which promises to give the chlorine in a free state instead of in combination as hydrochloric acid. This Messrs. PECHINEY claim to be able to do economically, at least to the extent of half the chlorine in the salt, by decomposing the ammonium chloride of the ammonia process with magnesia,—which is not a novel idea,—and the regeneration of the resulting magnesium chloride by the intervention of an oxychloride, which is an idea due to the fertile brain of Mr. WELDON. It seems, therefore, clear, to use Mr. WELDON'S words, that the LEBLANC process is not destined to remain the only means of obtaining hydrochloric acid; but at present he sees no immediate danger of it being entirely superseded for that purpose, although he considers the more complete utilization of the hydrochloric acid in the production of chlorine a problem most important to be solved. Of this he sees promise in a process, also introduced by Messrs. PECHINEY, by which a given quantity of hydrochloric acid is said to yield the same quantity of strong chlorine as by treatment with "WELDON mud," together with about twice that quantity diluted with other gases. If this result be attained, however, it is obvious that the presumed necessity for the continuance of the LEBLANC process essentially on account of its former bye-product, bleaching powder, will have undergone considerable diminishment, and it seems quite possible that the great chemical invention of the eighteenth century may have become by the end of the nineteenth a mere tradition and a name. Even in that case, however, Mr. WELDON sees no reason why the alkali industry should depart altogether from the banks of the Tyne, and this is about all the comfort that he offers to the Tyneside manufacturers. He points out that any process for

the recovery of chlorine in connection with the ammonia process will involve evaporations and a consequent enormously increased consumption of fuel, which would help to restore the balance in favour of the Tyne, especially if South Durham salt should become available at a reasonable price. Turning now to another branch of the subject, the processes suggested for the recovery of sulphur from alkali waste, which a year or two ago appeared to be of the first importance, it is evident that under present circumstances such inventions have comparatively lost in interest; but as indicating the progress of events it may be mentioned that Messrs. SCHAFFNER and HELBIG'S process has been sufficiently successful to affect the price of pyrites; whilst a contrivance by Mr. CLAUS for the recovery of sulphur from sulphuretted fumes, which some of the members of the Society saw last year as a novelty applied to a shaft in a London gas works, is said to be working satisfactorily in the works of Messrs. CHANCE.

Such then are the principal points in an address which could not have been quite free from a bitter alloy to some who heard it, whose capital is largely invested in the order of things that is said to be passing away. Mr. LOWTHIAN BELL no doubt expressed their feeling when, referring to Mr. WELDON'S self-applied metaphor of the watch-dog, he regretted that combined with it there was some suspicion of the part of the burglar. But evidently the Tyneside manufacturers will do their best to master circumstances rather than to be overcome by them. Even if the theories of Mr. WELDON should prove to be more substantial than Mr. PATTINSON seems inclined to give them credit for, there was hardly one present at the dinner, who heard his plucky manifesto on behalf of his fellow manufacturers, who did not heartily sympathize with it and give it credence.

Before leaving the subject of this meeting of the Society of Chemical Industry in Newcastle, we feel pleasure in congratulating the executive upon the announcement it was able to make as to the accession of five hundred new members during the past year. It cannot be admitted that even yet the society receives a support commensurate with its aspirations, but nevertheless the very considerable progress that has been made in this respect during twelve months will put it upon a much sounder footing—both financially and as representing the numerous industries based upon the application of chemical principles—than before.

DR. SHOEMAKER ON THE OLEATES.

ON the morning of the 4th inst., Dr. SHOEMAKER, of Philadelphia, delivered a lecture on "The Medicinal Use of the Oleates of Metals," at Westminster Hospital. Prefacing his remarks by the pleasure it afforded him in having to address a number of English medical students who had the advantage of a four years' course of study, as a minimum, in contrast with the American course, in which two years only was compulsory, he described the difference between the oleates made by the double decomposition of oleate of soda and a metallic salt and those made by the direct combination of metallic oxides with oleic acid, which latter, he considered as oleated solutions of the metallic oxides—not definite compounds and not possessing as efficient therapeutic properties as the others. He described several of the oleates (by him termed *true* oleates) made by double decomposition, several of which are solid and capable of being powdered, while others are pasty masses. In using them externally, he said they were best diluted with lard to a suitable strength. He objected strongly to the petroleum bases, such as vaseline or cosmoline, being used as diluents. He referred to the oleate of aluminium used as an ointment—1 or 2 drachms to the ounce of lard—as being a useful astringent where there was any muco-purulent discharge. Oleate of arsenic, a reddish brown waxy substance, acts as an escharotic, 5 to 20 or 30 grains to an ounce forming a suitable ointment. Bismuth oleate was useful in acne rosaceæ. Cadmium oleate, nickel oleate, silver oleate (useful in bed sores), and tin oleate were noted; the last being used for its polishing effect on the nails. Of the mercuric and mercurous oleates, he preferred the latter (made from mercurous nitrate). It was about one and half times stronger than the other. He was unable to show a sample to the meeting, but stated that it had a flocculent leaden colour, like that of mercurial ointment (probably due to some reduction of the mercury in it). Zinc oleate, made from sulphate of zinc, by double decomposition, seemed most prized by him; when in the state of powder, it forms a white pearly dust. It has been found very useful in eczema, excessive and fetid perspiration and tetter. In his hands he had not found the oleates of the alkaloids, or rather oleic solutions of them, so useful, and had especially failed to get beneficial effects from oleate of quinine applied externally.

The prospect of the passing of the Medical Acts Amendment Bill in the present session has been considerably affected by the rejection of the Franchise Bill by the House of Lords on Tuesday. Altohugh Mr. Gladstone in making a statement on Thursday night as to the intentions of the Government, said that no decision had yet been arrived at in respect to that particular Bill, this declaration must be read in the light of the facts that there are nine pages of proposed amendments in it on the notice paper, and that Earl Granville the same evening announced that all Government Bills of importance that were likely to lead to contention, would be withdrawn. Mr. Warton also had a question down as to the introduction of the Government Poisons Bill, which, however, may be presumed to have found an answer in Mr. Gladstone's general statement.

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At the annual meeting of the Forfarshire Medical

Association held in University College, Dundee, on the 3rd inst., it was agreed to send a petition from the Association to Parliament, asking that in the Medical Acts Amendment Bill now under consideration a provision may be included that a Pharmacopœia Committee be established, containing among its members practical pharmaceutical chemists from the three divisions of the United Kingdom.

* * *

It is announced that Her Majesty intends to confer the honour of a baronetcy upon Mr. Samuelson, M.P., and of Knighthood upon Professor Roscoe, in recognition of their services in connection with the Royal Commission on Technical Instruction.

* * *

The *Lancet* states that a petition has been presented to Her Majesty in Council praying for the grant of a charter of incorporation to the Institute of Chemistry and that the petition will be considered on the 15th inst.

* * *

The *British Medical Journal* reports a case of fatal poisoning that has occurred in Ireland, near Ballyjamesduff, co. Cavan, apparently through a mistake in a dispensary. At the inquest the medical man admitted that he had given a wrong bottle to the attendant and offered to make any reparation in his power. The jury returned a verdict that deceased had died from narcotic poison administered by mistake and added that there had been negligence on the part of the doctor. It would appear probable that tincture of opium was supplied instead of black draught.

* * *

According to a recent official report by Mr. Morris, the cultivation of ginger in Jamaica would appear to be dying out, the export of ginger from the island during the last five years having averaged 7·036 cwt., of the value of £16,000, against 11,219 cwt. worth £22,000 during the previous five years. This is attributed to the persistent cultivation of the plant, which is a very exhausting crop, in the the same lands year after year, as well as to the uncertain nature of the crop and the difficulty experienced in many districts in curing the rhizome properly.

* * *

At a recent exhibition held in connection with a meeting of the New York State Pharmaceutical Association, there was an exhibit of lactic acid prepared from grain by fermentation, and the acid was served as a beverage mixed with iced carbonic water. It is claimed that lactic acid may be in future substituted for tartaric and citric acid for many purposes.

* * *

In Guatemala, as in Ceylon, the unfavourable experience of cultivators with the cotton crop in recent years has caused them to turn their attention to cinchona planting. Indian seed is being used for the purpose, and, although the experiment is yet in its infancy, the results are described as being so far satisfactory, the young plants being in a very flourishing condition.

* * *

The Annual Meeting of the School of Pharmacy Students' Association will be held on Thursday, July 17, when the Annual Report of the Executive Committee will be read. The chair will be taken by the President, Professor Attfield, F.R.S., at 8 p.m.

Proceedings of Scientific Societies.

SOCIETY OF CHEMICAL INDUSTRY.

On Tuesday morning, the Third Annual Meeting of the Society of Chemical Industry was commenced in Newcastle-on-Tyne, in the Theatre belonging to the Literary and Philosophical Society, Westgate Road. The chair was taken at eleven o'clock by the President of the Society, Mr. Walter Weldon, and there was a large attendance of members.

At the commencement of the proceedings, the Mayor of Newcastle (Dr. H. W. Newton), and the Sheriff (Mr. T. Nelson), who attended the opening of the meeting in state, expressed a hearty welcome to the Society on behalf of the municipality of Newcastle.

The minutes of the previous meeting having been read and confirmed, the President called upon the General Secretary, in the absence of the Honorary Treasurer, to read the Financial Statement, which included a Balance Sheet for the financial year ending December 31, 1883 and a further account of receipts and expenditure since then to the present time, showing that the Society has now a balance in hand amounting to £1378 19*s*.

The adoption of the accounts was moved by the President, seconded by Mr. A. Chance, and carried *nem. con.* The General Secretary then read the Report of the Executive, in which the Council expressed much satisfaction that during the last twelve months the Society had continued to make good progress. At the date of its first general meeting in July, 1881, the number of members on its register was 297 ; by July, 1882, the number had increased to 1140 ; and at July of last year the number was 1390. Including twenty-five candidates elected that morning, the number of members of the Society was now 1809, while 120 non-members now subscribe to the Society's Journal. The Council had to deplore the loss during the past year of some most distinguished members of the Society, including Sir William Siemens, Mr. Peter Spence, Mr. Cromwell Varley, and Dr. Angus Smith, who as the first Chief Inspector under the Alkali Act had been brought very closely into contact with many chemical manufacturers. During the past year two new local sections of the society had been established: one in Birmingham, with Mr. Alexander M. Chance as chairman, and one at Glasgow, with Mr. Edward C. C. Stanford as chairman. Six local sections of the society were thus now in operation, and the total number of papers which had been read before them during the session just closed was 68, divided as follows :—Birmingham section 3, Glasgow section 7, Liverpool section 14 London section 20, Manchester section 17, and Newcastle section 7. Many of those papers were of great practical value and utility, and to their authors, as well as to the executive officers of the various sections, the best thanks of the Council and of the society were due. Reference was also made to some amendments of the bye-laws which would be laid before the members for approval.

The adoption of the report was moved by the President, seconded by Mr. Newall, and carried unanimously.

The President's Address.

The President (Mr. W. Weldon) then proceeded to deliver an address, of which the following is a *résumé* :—

The President commenced by referring to the paper read by him eighteen months ago, before the London section of the Society, in which he sketched the then present condition of the soda industry, and indulged in some speculations as to its future. Since then, he said, the ammonia process had continued its victorious advance, and the production of Leblanc soda had still further diminished. That further diminution was indeed inovitable; but a consequent closing of more Leblanc soda works had been temporarily avoided by combinations among Leblanc soda makers to reduce production. These combinations

had been regarded as simply combinations to force up the price of certain products; but there was no room to doubt that the rise which had taken plece in the price of the products in question, as a consequence of these combinations, must necessarily have taken place, if those combinations had not been formed The manufacture of chlorine and Leblanc soda, without profit, or at a loss, could not have gone on much longer. It must soon have resulted in the forced withdrawal of the weaker manufacturers from a hopeless struggle; and the effect upon prices of diminished production brought about in this way would have been the same. While, however, the makers of soda by the Leblanc process were to-day in the position, to which they had so long been unaccustomed, of being able, not only to make both ends meet, but to make one end somewhat overlap the other, the Leblanc process, as a means of manufacturing soda, had served its time. Per given quantity of soda yielded by it, it was more than 70 per cent. more costly than the ammonia process; and its only claim to continue to live consisted in the fact that it yields hydrochloric acid. The world must continue to be supplied with chlorine, and at present the immediate raw material of the chlorine manufacture was always hydrochloric acid. How to obtain, in a useful state, the chlorine, at present thrown away as calcium chloride, of the salt decomposed by the ammonia process, was a problem which has long occupied many minds. When, last year, it was known that Mr. Mond had patented a process to that end, which would, under given conditions, enable the manufacturer of ammonia soda to utilize both the constituents of the salt which he decomposes it was widely felt that the solution of this problem had been probably reached. But it was a process which would involve that the ammonia employed in the manufacture of ammonia soda, instead of being continually regenerated and used again as at present, should be used as a reagent in that manufacture only once, and should then be sold as ammonium sulphate; hence the conditions for its extensive application did not at present exist. This drawback in Mr. Mond's process was due to a fact of which, until he discovered it, chemists were not aware, that when ammonium chloride and acid ammonium sulphate are heated together, no reaction takes place between them, analogous to that which takes place between sodium chloride and acid sodium sulphate, as in the second stage of the Leblanc reaction, at whatever temperature. Below a certain temperature, nothing happens; above that temperature, all that happens is that ammonium chloride volatilizes. That this fact remained to be discovered in 1883, the President considered to be an indication that, in the search for new organic compounds in which chemists for so many years past have been absorbed, the pursuit of inorganic chemistry has been unduly neglected. The residual liquor of the ammonia soda process, after such part of its ammonia as is combined with carbonic acid, together with any that may be in the free state, has been distilled off is a nearly saturated mixed solution of ammonium and sodium chlorides. On evaporating, the sodium chloride, being the less soluble of the two salts, falls and may be fished out: leaving eventually a mother-liquor consisting of solution of ammonium chloride only. Mr. Mond's process consists in thus separating the sodium chloride of the mixed solution, evaporating the mother-liquor to dryness, so as to obtain solid ammonium chloride, and then treating this solid ammonium chloride by enough sulphuric acid to form acid ammonium sulphate, HNH_4SO_4, the chlorine of the ammonium chloride going off as HCl. The residual acid ammonium sulphate can either be converted into normal ammonium sulphate by treatment with free ammonia or used in the manufacture of richly ammoniacal phosphatic manures. Mr. Weldon then pointed out some of the conditions which would be necessary to the application of this process to the whole of the ammonium chloride produced by a single ammonia soda maker. Mr. Mond, he said, manufactures fully 50,000 tons of ammonia soda per annum. To treat the whole of the ammonium chloride corresponding to this quantity of ammonia soda by that form of the process in question in which the acid ammonium sulphate at first produced should be afterwards converted into normal ammonium sulphate by means of free ammonia, would require, not only that he should manufacture per annum 128,000 tons of ammonium sulphate, but also that he should command a constant supply of one-third more ammonia than the total quantity at present produced in all Great Britain and Ireland; while to treat that vast quantity of ammonium chloride by the form of his processs in which the acid ammonium sulphate intermediately produced should be employed to react on calcium phosphate, he must manufacture per annum a quantity of manures containing 64,000 tons of ammonium sulphate, which could not be less than 350,000 tons, or 40 tons for every hour in the whole year, and the production of which would require a supply of ammonia equal to two-thirds of the total quantity at present produced in all the gas works of the United Kingdom. It would involve the annual consumption of a quantity of ammonia, the production of which in gas works at present requires the distillation of five millions of tons of coal, and the concentration of which, as gas-liquor, upon any one spot, would require that gas-liquor should come pouring in there at the rate of from a ton to a ton and a half per minute, night and day, week-days and Sundays, all the year through. Obviously therefore this process could not be extensively applied so long as the manufacturer continued dependent for his supply of ammonia mainly on the distillation of coal for the manufacture of illuminating gas; and could not, indeed, be applied on any serious scale except in proportion as means were realized of obtaining as ammonia the nitrogen of coal used as fuel. Such means doubtless could be realized; but much would happen before the supply of ammonia became so abundant as to permit the ammonia soda maker to use his principal reagent only once and then to sell it. It had also been proposed to obtain hydrochloric acid in connection with the ammonia process, by a modification of the ammonia process itself, in the substitution of sodium sulphate for sodium chloride as its starting point,—first decomposing salt by sulphuric acid, to obtain hydrochloric acid and sodium sulphate, as in the Leblanc process, and then treating that sodium sulphate by ammonia and carbonic acid. The experiments made in this direction had placed beyond doubt that a sulphate of soda ammonia process, whatever its commercial merits or otherwise, is in itself perfectly practicable. The lower solubility, in water at ordinary temperatures, of sodium sulphate than of sodium chloride, had been supposed to be an obstacle to the realization of such a process; but there was no inconvenience in employing, in the operation of decomposing sodium sulphate by bicarbonate of ammonia, a temperature of about 34° C., and at that temperature sodium sulphate is more soluble than sodium chloride: so that it was quite practicable to obtain, by treating by CO_2 an ammoniacal solution of sodium sulphate, more bicarbonate of soda than could be obtained by the corresponding treatment of an equal volume of ammoniacal brine. It had also been supposed that only one-half of the sodium sulphate treated by ammonia and carbonic acid would undergo decomposition, the second half of it going to form, with the ammonium sulphate, resulting from the reaction of bicarbonate of ammonia on the first half of it, double sulphate of sodium and ammonium; but experience had proved that this is not so. Nor did the regeneration of ammonia by means of lime from the ammonium sulphate of the mother-liquor of a sulphate of soda ammonia process present any difficulty. But to merely substitute for the Leblanc method of decomposing sodium sulphate its decomposition by bicarbonate of ammonia, would surely be a game not worth the candle. In the Leblanc process, it was the first operation of the Leblanc process, the

cost of his sodium sulphate, which placed the maker of Leblanc soda at such a disadvantage as compared with the maker of ammonia soda. If sodium sulphate cost no more than salt it would be Leblanc soda, and not ammonia soda, which would be cheaper of the two ; since the cost of manufacturing Leblanc soda from sodium sulphate was appreciably less than the cost of manufacturing ammonia soda from salt. Therefore, to merely substitute for the Leblanc method of decomposing sodium sulphate the method of decomposing it by bicarbonate of ammonia would be to substitute for the later operations of the Leblanc process a series of more costly operations, having no advantage beyond that of yielding a more concentrated product. Another process, however, based on the decomposition of sodium sulphate by bicarbonate of ammonia, had recently been devised, in which the sodium sulphate to be afterwards decomposed by bicarbonate of ammonia would be obtained, and hydrochloric acid at the same time, without consumption of sulphuric acid, except to make up mechanical loss, by means of one and the same quantity of sulphuric acid continually regenerated and used again. This process was the invention of three members of the firm of Gaskell, Deacon and Co., of Widnes: Mr. Carey, Mr. Holbrook Gaskell, junr., and Dr. Hurter. These gentlemen had found a means of so decomposing ammonium sulphate as to obtain, not only its ammonia in the free state, but also its sulphuric acid, if not as free sulphuric acid, at any rate in a state in which it could decompose sodium chloride. Chemists had long known that when ammonium sulphate is heated to a certain temperature one-half of its ammonia is set free and flies off, the other half of it remaining behind as hydrogen ammonium sulphate; but Messrs. Carey, Gaskell and Hurter had discovered that if a mixture of equivalent quantities of ammonium sulphate and sodium sulphate be heated to fusion, and steam be injected into the liquid mass, the whole of the ammonia of the ammonium sulphate is disengaged in the free state: its sulphuric acid combining with the sodium sulphate to form hydrogen sodium sulphate, which alone remained behind. Upon this most interesting reaction there might obviously be based a soda process which should begin by obtaining sodium sulphate and hydrochloric acid by the reaction of "bisulphate of soda" on sodium chloride, the normal sodium sulphate so obtained being then decomposed by bicarbonate of ammonia, with production of bicarbonate of soda and ammonium sulphate, such ammonium sulphate being then so treated as to regenerate, by one and the same operation, both ammonia for use again, and bisulphate of soda for use again. The question whether or not this process could be reduced to practice must obviously depend, mainly if not solely, upon the new reaction being carried to such completeness as to avoid any serious loss of ammonia. Charging against the hydrochloric acid yielded by this process, the cost of those operations which were in excess of the operations which the ammonia soda maker performs at present, it might be reckoned that the cost of the soda would be practically the same as that of ammonia soda as at present manufactured from brine. The process would start from solid salt, which was more costly than brine ; but, in some localities, the value of the lime which is required for the decomposition of the ammonium chloride of the present form of the ammonia process, but which would not be required in Messrs. Carey, Gaskell and Hurter's process, would fully compensate the greater cost for raw materials of the latter than of the former. The operations, the cost of which would thus have to be charged against hydrochloric acid yielded, were those: firstly, of evaporating to dryness the mixed solution of ammonium sulphate and sodium sulphate constituting the mother-liquor of the bicarbonate of soda obtained by treating an ammoniacal solution of sodium sulphate by carbonic acid ; secondly, of treating the residue of that evaporation, after addition to it of more sodium sulphate, for the regeneration of ammonia and the production of bisulphate of soda; and, thirdly, of then furnacing that bisulphate of soda with an equivalent quantity of salt. Mr. Weldon then entered into details as to the cost of these operations, and gave as his conclusions that taking the minimum present cost of aqueous hydrochloric acid of 27 per cent. at £1 per ton; that Messrs. Carey, Gaskell and Hurter's process could yield, per ton of sodium carbonate manufactured by it, 2·4 tons of such acid, worth at least £2 8*s.*; and that, of the three operations the cost of which would have to be charged against those 2·4 tons of hydrochloric acid, 12*s.* would pay for two: there would thus remain £1 16*s.*, the balance left after the deduction from which sum of the cost of effecting Messrs. Carey, Gaskell and Hurter's reaction on about 2 tons 12 cwt. of a mixture of ammonium sulphate and sodium sulphate would be the measure of the advantage of their process over the Leblanc process. A most important future might be anticipated for this process of Messrs. Carey, Gaskell and Hurter's were it not for the results of a renewed attempt to realize the old idea of decomposing the ammonium chloride of the present form of the ammonia process by magnesia, and then so treating the resulting magnesium chloride as to obtain its chlorine in a useful form and at the same time to regenerate magnesia for use again. In this method of procedure there would be one operation less than in Messrs. Carey, Gaskell and Hurter's process: the operation of evaporation, which would be practically the same in both processes, being followed, in Messrs. Carey, Gaskell and Hurter's process by two operations, in the first of which there would be treated, per ton of sodium carbonate manufactured, about 52 cwt. of mixture of sodium sulphate and ammonium sulphate, and in the second about 68 cwt. of mixture of sodium chloride and hydrogen sodium sulphate, while, in what might be called the magnesia process, the operation of evaporation would have to be followed by simply the one operation of decomposing about 18½ cwt. of magnesium chloride. To which might be added the far graver consideration that while Messrs. Carey, Gaskell and Hurter's process could yield the chlorine of the salt treated by it only as hydrochloric acid, a large part of the chlorine of magnesium chloride could be obtained directly in the free state. Messrs. Pechiney and Co., of Salindres, in the South of France, had again attacked the problem, and had reached results which compel the conviction that the industrial realization of the decomposition by magnesia of the ammonium chloride of the ammonia process was now only a question of time. If, then, the manufacturer of ammonia soda should become able to obtain as magnesium chloride the chlorine which he at present throws away as calcium chloride; how was that magnesium chloride to be dealt with? When an aqueous solution of magnesium chloride is subjected to evaporation, vapour of hydrochloric acid begins to be disengaged so soon as the quantity of water present has fallen to six equivalents, per equivalent of magnesium chloride. Fifteen or sixteen years ago, considerable quantities of solution of magnesium chloride, concentrated to that point, had been treated in muffle furnaces, but it was found that the furnaces were rapidly destroyed, by reason of the concentrated solution fed into them penetrating their beds, and causing the beds to "rise," and the experiments were therefore abandoned. Seeking, during many years subsequently, means of treating by heat and air, under industrial conditions, chlorides of various metals, Mr. Weldon said he was at length led, in 1881, to the idea of adding to a concentrated solution of a chloride or mixture of chlorides, oxide of the same metal or metals, and then treating by heat and air solid masses of the resulting mixture; and since early in 1882, Messrs. Pechiney and Co. had been engaged in endeavouring to realize this method of working, especially as applied to magnesium chloride, enormous quantities of which they obtain as a bye-product of the manufacture of salt from sea water, and also to manga-

nese chloride. In the case of magnesium chloride, the product of the addition to its aqueous solution of magnesium oxide was of course, not a mere mixture, but the compound, magnesium oxychloride. Mr. Weldon had found in the laboratory that this body, heated in contact with air under certain conditions, gives off an appreciable part of its chlorine in the free state; and the larger experiments which have since been made at Salindres left no doubt that fully half the chlorine of magnesium chloride might be obtained directly as free chlorine by converting the magnesium chloride into oxychloride, and then heating that oxychloride, under certain conditions, in presence of air. A manufacturer of ammonia soda, able to decompose his ammonium chloride by magnesia, would, therefore, be able, by evaporating, per ton of ammonia soda manufactured, a quantity of solution of magnesium chloride containing about 5½ tons of water, and then heating in presence of air a mixture of about 18½ hundredweight of magnesium chloride with about 8 hundredweight of magnesia, to obtain the quantity of free chlorine corresponding to very nearly a ton of bleaching-powder,—being the quantity of chlorine the present cost of which was close upon £6,—and, in addition, a quantity of hydrochloric acid corresponding to something over a ton of aqueous acid of 27 per cent. Clearly, therefore, the Leblanc process was not destined to remain the only means of obtaining hydrochloric acid; and there was no doubt that the use of hydrochloric acid as the immediate raw material of the chlorine manufacture was also one of those things in respect of which the old order must—partially, at any rate—give place to new. While, however, it was now quite certain that chlorine would be manufactured at least from magnesium chloride, it could hardly be conceived that its manufacture from either magnesium chloride or calcium chloride could even more than partially displace its manufacture from hydrochloric acid, whatever changes might take place in the mode of obtaining hydrochloric acid. Mr. Weldon, therefore, proceeded to consider the question of the utilization of hydrochloric acid in the chlorine manufacture more completely than it is at present, as a question upon which the continued existence of the Leblanc process now mainly depends. The present Weldon process, even when performed to the very best advantage, did not yield more than one-third of the total chlorine of the hydrochloric acid treated by it, the other two-thirds of that chlorine being lost as calcium chloride. It was, therefore, thus unquestionably a barbarous process, though it met well enough the wants of the time when hydrochloric acid could be counted as having no value, and when the two problems in respect of the chlorine manufacture which pressed to be dealt with were simply those of how to diminish the then chief item of the cost of chlorine—that for native manganese—and how to keep the offensive residual product of the treatment of that native manganese by hydrochloric acid out of the water-courses. But for some years past inventors had been endeavouring to devise a hydrochloric acid chlorine process which should yield in the free state practically the whole of the chlorine of the acid treated by it; and a process which the speaker believed would do this was one of a group of processes which Messrs. Pechiney and Co. had been working out. The process in question was simply a new form of a very old idea. Its first operation consisted in digesting with aqueous hydrochloric acid an oxide of manganese which has been regenerated from manganese chloride in the dry way. There were thus obtained undiluted chlorine, and a residual solution of manganese chloride. The latter was then evaporated to dryness, and the solid manganese chloride so obtained was then heated in intimate contact with atmospheric oxygen. The chlorine of the manganese chloride was thereby driven off in the free state,—mixed, of course, with other gases,—and its manganese obtained as an oxide, rich in oxygen, with which to recommence the round of operations. Per given quantity of hydrochloric acid treated by it, the process yieldod practically the same quantity of strong chlorine as could be obtained from the same quantity of acid by means of Weldon mud, together with something over twice that quantity of chlorine diluted by other gases. The difficulties which had been encountered in the endeavour to realize this process had been mainly with respect to the apparatus and mode of working by which to effect the often proposed reaction of atmospheric oxygen upon manganese chloride. Manganese chloride was a somewhat readily fusible salt; oxygen reacting upon it below its fusing point, only slowly; for the reaction to go on sufficiently rapidly, the temperature employed must be above the fusing point of the manganese chloride, and the latter must present to the air by which it is treated a very considerable surface; while a fused mass of manganese chloride not only presented far too small a surface, but was destructive of all materials of which apparatus for treating it industrially could be formed. For the treatment of manganese chloride, as of magnesium chloride, the principle adopted at Salindres was that already referred to, of mixing the chloride to be treated by heat and air with an oxide of the same metal: the main function of the oxide being to mechanically divide the chloride, so as to permit of the chloride being heated to above its fusing point, without the mass treated becoming fluid, or ceasing to be penetrable by air. The difficulties had been now completely overcome, and it seemed certain that it would soon be possible to manufacture chlorine from the hydrochloric acid of the Leblanc process at the rate of the quantity of chlorine corresponding to a ton of bleaching powder per little more than fourteen hundredweight of salt. Given this result—a result diminishing by two-thirds the quantity of Leblanc soda necessary to be manufactured in order to the manufacture of a given quantity of chlorine from Leblanc hydrochloric acid—would it enable the Leblanc process, thus shorn of its proportions, to continue to live, in face of the decomposition by magnesia of the ammonium chloride of the ammonia process, and the direct obtainment from the resulting magnesium chloride of one-half of its chlorine in the free state? This might be so; but, as yet, the data for a conclusion on the point were insufficient, and of those which yet existed, some told one way, and some the other. If, however, unfortunately, that question should be eventually answered in a sense adverse to those whose capital was invested in the Leblanc process: must the manufacture of soda disappear from Tyneside? It was on Tyneside that "artificial soda," as it used to be called, was first manufactured in England: must, in such case, that district know that industry no more? The speaker was not of that opinion. At present, the manufacturer of ammonia soda from brine employed, per ton of soda manufactured, from a ton and a quarter to a ton and a half of coal, and the quantity of brine containing about 46 cwt. of salt. His coal consumption was thus light, but the quantity of salt which he consumed was twice the quantity equivalent to the soda he manufactured. Any method, however, of obtaining, either as free chlorine or as hydrochloric acid, the chlorine of the salt decomposed by the ammonia process, must necessarily involve the evaporation of all the water employed in that process,—during which evaporation that portion of the salt employed in it which at present escaped utilization would be recovered,—and must moreover involve a subsequent operation, also requiring an expenditure of fuel. Any such method must thus reduce to absolutely its theoretical amount the quantity of salt consumed in the ammonia process, per unit of soda manufactured thereby, reducing it to one-half the quantity at present required by the manufacturer of ammonia soda from brine, but must at the same time increase his consumption of coal, per unit of soda, by at least between 100 and 200 per cent. Under such changed conditions, at any rate when Cleveland salt should have become obtainable at New-

castle at a cost not much greater than that of Cheshire salt in Lancashire, it ought to be possible to manufacture ammonia soda in that district very nearly if not quite as cheaply as in any other locality. The speaker said that it was not willingly that he had announced a new—and much more serious than any previous—menance to an industry already sorely tried. He would have preferred to have been able to prophesy smooth things with respect to the Leblanc process. Facts, however, must be looked in the face. Nothing could be less wholesome than the atmosphere of a fools' paradise. And the watch-dog at the gate, who gave a timely notice of the approach of unwelcome visitors, at least rendered such service as was in his power. If such changes as those indicated as now certain to be accomplished at least partially were unwelcome, it was only in so far as they might affect individuals. By such changes, individuals might, and, alas! did suffer; but the world gained by them. No industrial process was ever superseded, however partially, except by a better process. And in so far as the Leblanc process might be doomed to still further restriction, it could only be because some other process would give mankind cheaper soda and cheaper chlorine than it. The various proposed new processes spoken of all complied with at least one of the ideals towards which all progress in such matters must henceforth tend. They all possessed in common one feature certain to be held essential to all industrial chemical processes in a not distant future. They were all processes yielding no waste product; processes completely utilizing all the constituents of all their raw materials. Excepting coal and water, nothing would be manipulated in any of them which was not finally yielded either as commercial commodity, or as regenerated reagent for use again. Amongst the many transcendant merits of the beneficent invention of Nicholas Leblanc, of immortal memory, that of yielding no waste product was not included. There were spots on the sun; and the Leblanc process yielded alkali waste. Countless had been the efforts to utilize at least one of the constituents of that residue; but none of them had hitherto fully succeeded. Now, however, ninety-seven years after the invention of the process to which it is chiefly due that soap, and glass and paper, and countless other commodities only less useful than these, have been placed within the reach of all mankind; seventy-four years after its inventor, "the creator," as Hofmann puts it, "of incalculable wealth for his species," put an end to his existence because he wanted bread,—which made it so pleasant to know that two generations afterwards he at least received a stone statue, towards the erection of which, it did not appear that any English soda maker contributed; now when one could not but fear that the long day of the Leblanc process might be tending towards its close, a means of utilizing both the principal constituents of that residue seemed almost in sight. To speak now of the recovery of sulphur from Leblanc soda waste might seem a kind of anti-climax; but the gallant attempt to realize the Schaffner and Helbig process to that end upon which Mr. Alexander Chance had recently expended so much enthusiastic effort, and the firm of which he was a member the greater portion of £10,000, had not only resulted in a reduction in the price of pyrites, but also in the suggestion of various other processes for the accomplishment of the same object. The combined process in question would commence by bringing the calcium sulphide of alkali waste into solution as calcium sulphydrate, by treating a mixture of waste and water by sulphuretted hydrogen. The second operation would consist in evaporating the resulting solution of calcium sulphydrate, and so driving off its sulphur as pure H_2S; and the third and final operation in burning off the hydrogen only of that sulphuretted hydrogen, setting its sulphur free. The third of these operations had for some time past been under experiment in the works of Messrs. Chance Brothers, at Oldbury. The apparatus used in it was one invented by Mr. C. F. Claus, of London, and consisted of a kiln in which there was a deep bed of fragments of porous material, through which, when the apparatus was at work, there was passed a mixture of sulphuretted hydrogen with a carefully regulated quantity of air. The bed of porous material was maintained at a high temperature by the heat of the reaction which took place as the mixture of gases passed through it, and from the mixture of gases and vapours passing off from it sulphur condensed as that mixture cooled. The operation thus cost nothing for fuel, and its cost for labour was scarcely more than the cost of from time to time removing sulphur from the receptacles in which it had condensed and collected. The first of the three operations was in industrial operation, at Rassuen, in the South of France, in connection with a most ingenious process, invented by M. Lombard, of Marseilles, in which calcium sulphydrate was used to precipitate dicalcic phosphate from the solution obtained by dissolving native calcium phosphate in hydrochloric acid. It was also in operation on a semi-industrial scale in the alkali work of Hrüschau, in Moravia. Its cost was simply that of charging waste and water into horizontal cylinders furnished with mechanical agitators, keeping these agitators in motion during the operation, and at the end of the operation discharging the contents of the cylinders. The second of the three operations was under experiment at Hrüshau, it was obviously more costly that the first or third; but it yielded in addition to sulphuretted hydrogen, another product, which it was hoped might pay nearly, if not quite, the whole cost of the three operations. This other product was chemically pure calcium hydrate, resulting from the reaction—

$$CaH_2S_2 + 2H_2O = CaH_2O_2 + 2H_2S.$$

Unlike the recovered calcium carbonate of the Schaffner and Helbig process, this calcium hydrate could be readily obtained absolutely free from impurities, since no impurities precipitated with it, and its physical condition was such that water or a solution ran from a heap of it almost as readily as from so much sand. It was incapable of causticizing solutions of sodium carbonate, more than partially; it was too dense for use in Weldon oxidizers; but it seemed not unlikely to prove suitable for use in bleaching powder chambers. If it should prove to be the case, on the one hand, that this dense crystalline calcium hydrate should have the value of an equivalent quantity of ordinary lime, and, on the other hand, that the hydrogen of sulphuretted hydrogen could be oxidized, practically completely, without at the same time oxidizing any appreciable proportion of its sulphur, an almost ideally perfect solution of the problem of the utilization of the residual product of the Leblanc process would at last have been reached. It could only be hoped that that solution would not have arrived too late.

At the conclusion of the address, Mr. Isaac Lowthian Bell said he had been requested by the first president of the society, Sir Henry Roscoe, whose distinguished services, all were glad, had been recognized recently by Her Majesty, to express the thanks of the meeting to the President for the address he had just delivered; and, as that was the last meeting at which Mr. Weldon would preside, he would take that opportunity of combining with those thanks the thanks which were his due for the very distinguished manner in which he had discharged the duties of his high office. These duties had been of such a character that it would require all the merits of his successor to reconcile them to his loss as their President. They could only hope that in his more retired sphere of action he would continue to address them in those friendly "barks" of which he had given them so excellent an example on the present occasion. He could only regret, for his own part, that while the President warned them of the approach of the most unwelcome intruder, he himself, upon more than one occasion—perhaps upon the present occasion—was the intruder himself.

They had had a very excellent and eloquent retrospect of the soda trade; they had had an equally eloquent forecast of what was probably to come. What he would like to know was, when were they to rest and be thankful? when to cease being overwhelmed with some mode with which Mr. Weldon might choose to associate his name, as he had done in the past? Mr. Weldon consoled them with the statement that while they suffered themselves it was for the gain of the world. He had no doubt his friends in the soda trade were philosophers enough to allow that consolation to have its proper weight. He must say that if they could derive any satisfaction, it must be that which they had received that morning in listening to the language of Mr. Weldon, of being assured, as they had just been, that they had done much for the prosperity, not only of that district, but of the world at large.

Professor Roscoe seconded the vote of thanks. Speaking in the name of those who came from a distance, he said that their journey to Newcastle had already been repaid by their having heard what they had in the excellent address. For his own part, he happened to know some of the duties and some of the works devolving upon the president of that society, and he could only say that they owed Mr. Weldon a deep debt of gratitude. The success which had attended that society was in a great measure due to the earnest efforts which he, during the last twelve months, had made to put the society on a proper footing.

The President, in replying, said he felt very proud to have held the honourable position of president to that society, and he regretted that circumstances had prevented him from going into the work as he should like to have done. Still, he might claim to have emulated the example set him by all his colleagues, and by absolutely every officer of the society, without exception, in such devotion to the interests of the society as was possible.

Alteration of Bye-Laws.

The President said there were certain alterations proposed in the bye-laws of the society. As the bye-laws stood at present, the only subject the society had power to discuss was that of ideas relating to improvements in the various branches of chemical manufacture; and he thought no straining of these words could make them include, for example, the discussion of modes of sampling and testing, in which so many of their members had taken also much interest. It was perfectly clear to his mind that in their bye-laws, as they at present stood, many other interesting subjects, such as legislation, were debarred from discussion, unwisely and unnecessarily. The Council therefore recommended that that meeting should confer upon the society power to discuss—and not only to discuss, but to deal with—all matters whatever of interest in connection with the practice of applied chemistry. There were other changes proposed by the Council, one making the retiring president eligible for re-election, and another affecting the expenditure of the local sections

The amendments were adopted by the meeting.

Election of President.

The President said it had been the custom to elect the president by the vote of the meeting, and he proposed that the president for next year be Dr. Perkin, President of the Chemical Society.

Professor Roscoe seconded the motion, which was agreed to, and Dr. Perkin briefly returned thanks.

Next Place of Meeting.

Dr. Ludwig Mond then moved that the annual meeting of the society be held next year in London, where it was their custom to hold every second meeting.

Ald. Newall, of Gateshead, seconded the motion, which was agreed to.

Analysis and Testing.

Mr. Tyrer moved—"That it is desirable to appoint a standing committee to consider how to carry into practical effect the resolutions of the various local sections upon uniform methods of analysis and testing."

Mr. John Williams seconded the resolution, which was carried unanimously.

The proceedings of the sitting then terminated.

Visits to Works.

Shortly after the close of the meeting the members assembled at the office of the *Newcastle Daily Chronicle*, where the operation of stereotyping as practised in connection with a large daily newspaper was shown and explained. The "forme" having been received from the composing-room with a short notice of the visit contained in it, was at once moulded; a cast was then taken, which was laid on one of Hoe's machines, and in a few minutes every member present was supplied with a copy of that edition of the paper.

A large party then went on board one of the Tyne steamers and proceeded up the river to Elswick, where they inspected the works of Messrs. Armstrong, Mitchell and Co.

On Thursday a special steamer was to convey the members down the river to St. Anthony's, where the works of Messrs. Locke, Blackett and Co., were to be visited. Afterwards the company were to proceed to view the Tyne Chemical Company's Works, Gateshead, where a lunch was to be provided by Messrs. Allhusen. Then the steamer was to take them to Jarrow to inspect Palmer's Shipbuilding Works.

On Friday the programme, after an inspection of the machinery of the Swing Bridge, included a visit to the works of Messrs. Tennant and Co., and the Tharsis Sulphur and Copper Company at Hebburn; and a visit to the Smelting and Lead Works of Messrs. Cookson and Co., of Willington.

The Dinner.

The annual dinner took place on Wednesday evening in the Banqueting Hall at Jesmond Dene. The chair was taken by Mr. Walter Weldon.

After the usual loyal toasts had been duly honoured,

The Chairman, in calling upon Professor Roscoe to propose the next toast, said he could not do so without expressing his own great gratification—a gratification which they would all heartily share—at the Royal recognition of Professor Roscoe's great services, not only to science, but also to the cause of education, which Her Majesty had been graciously pleased to signify her intention of bestowing upon him. For his own part, he was sure that "Sir Henry Roscoe" would never sound quite so gratefully in his ears as the older title, the name under which their first president had won great honours in science, and in the affectionate regard of all who had the privilege of knowing him. Still they could not but rejoice at the honour which he was about to receive from the highest fountain of honour; and, although he would soon cease to be plain Professor Roscoe, yet in gaining his new title he would not lose his old one. The two would combine together to form that compound of which Mr. Isaac Lowthian Bell had spoken in the morning, "Professor Sir Henry Roscoe."

Professor Roscoe then proposed "Success to the Industries of Newcastle." He said, he felt most deeply the flattering terms in which the President had spoken of his merits, and the kind way in which his friends, the members of the Society of Chemical Industry, had received the notification. He wished to say also that he felt it was a recognition less of his own merits than of the profession of science, and in that respect he received it gratefully and thankfully. He had to propose to them "The Industries of Newcastle," and to call upon them to wish well to those great industries which were founded by Losh and by Pattinson, and were yet of world wide renown. He wished also to thank most heartily those gentlemen who had kindly placed their works at the disposal of the society on their present visit, and, first of all, he had to thank Sir William Armstrong for having in the

most kind way, placed that noble hall at their disposal. He coupled the toast with the names of two gentlemen well known not only there, and not only in the Society of Chemical Industry, but everywhere where applied chemistry was known—Mr. Hugh Lee Pattinson and Mr. Alfred Allhusen.

Mr. Pattinson humorously expressed the thanks of the "distressed" industries of the Tyne for the very flattering and kind manner in which their prosperity had been proposed. It needed all their good wishes to revive the industries of the Tyne from the state of desolation and deep despair to which they had descended. They had called in the days of desolation for the songs of Zion, and they responded to the call. The Northern chemical manufacturers would never give way. They had seen bad days and good days, and, like men of mettle, they bore the days of prosperity with calmness and moderation, and did not sink under the days of adversity. It was certainly an unkind cut to call upon one of the most depressed of the Tyne industries to respond, after the terrible flagellation the President had inflicted upon it that morning. But the flagellation was inflicted with a friendly hand, and they knew there was no venom in the prognostication. Perhaps, however, the President had descended to that conspicuous error of prophesying before he knew. Threatened men lived long. They had heard of their extinction a good many years ago, yet they survived. They therefore did not despair, but depended on that celebrated expression of a very great statesman, "The resources of civilization are not exhausted." They might be threatened by some terrific invention by Mr. Mond, M. Pechiney, and other great *savants*, but in their own works might arise some great inventor, so that with the poison might be administered the antidote. The industries of the Tyne were really in a "badish" way: lead, coal, timber—anything they might choose to name—were all in the ditch together, and that was one little consolation to him personally. If his were really the only industry that was suffering, he could take a very gloomy view of matters. But he was suffering with others, and so plucked courage from despair, and began to think that after all it might be but a passing cloud of adversity, and that when prosperity came to others, he might also recover. The President had pictured a black prospect. But still they stuck to facts; and they had a good old industry in their hands to which the President had contributed, and to which he had given a great stimulus. He thought that industry was not destined to be extinguished. Before the fine-spun scheme that had been referred to was worked out they would find they had a toughish job. As long as chlorine was required in the industries of the world, there would be room for their existence; as long as it held its position as one of the elemental bodies of chemistry, they had a good prospect before them. It was valuable and always would be valuable just in the same way as gold and diamonds were always valuable.

Mr. Alfred Allhusen, who also responded, said he endorsed every word that Mr. Pattinson had said. He had, he believed, conveyed the feelings of the majority of the Leblanc soda makers on the Tyne.

The Chairman then proposed the "Society of Chemical Industry." He said, with very few exceptions, all present were members of the Society of Chemical Industry, and they would not have been such if they had not believed that the objects for which that society was established were useful and important objects; and they, therefore, needed no persuasion to wish it increased prosperity and continued success. That the Society of Chemical Industry had already done some useful work he thought they would admit, and that the good work it had already done was but an earnest of the better work which it yet would do, he felt sure they would all hope and believe; and show that belief in the manner in which it was usual to do on such occasions—to drain a bumper to the continued prosperity of a society that aimed at aiding to attain to the theoretical perfection of all the industries that were based upon applied chemistry. He had infinite satisfaction in associating with that toast the name of the famous chemist, the illustrious inventor, who had been that morning elected president of their society—Dr. Perkin.

Dr. Perkin, after thanking his fellow members for the hearty manner in which they had received the toast, also for the honour they had done him in electing him president for the next year, said he felt it was a position which he would not be very well able to fill, after the eminent men who had already occupied it. It was very satisfactory to find that that society, although so young, had become so large. He very well remembered how, four years ago, when Professor Roscoe asked him to second the proposition that the society should be formed, that he did so with some misgivings. He assumed now that the experiment had been a greater success even than Professor Roscoe anticipated. The success of that society showed that it was needed; and there could be no doubt that the meeting together of men to work out chemistry as applied to manufactures, and the interchange of thought which must as a consequence accrue, would have a stimulating influence and do good to the advancement of the industries of the country. They had heard from Mr. Weldon that day all about the chemical industries with reference to the soda process and the great changes that had taken place. The manufacture nowadays was a very different thing from what it was five-and-twenty or thirty years ago. Changes then were comparatively slow, and now they were rapid—he might almost say incessant. For a man to be a successful manufacturer now, he required to be ever on the march, and constantly pressing forward. For their society he thought there was great hope for the future. In the meantime, they must be very thorough, and the members must not be standing still, but pressing forward. Their cry must be always "Excelsior! Excelsior!"

The Chairman proposed "The Officers of the Society." He could not associate with it the name of every one of those officers whom the toast was intended to include, for if every member of the society who held office were mentioned there would be found one officer to every 12¼ men. The total number of the officers was not far short of 130. He coupled with the toast the names of the Honorary Foreign Secretary, Mr. Ludwig Mond; the Editor of the Journal, Mr. Watson Smith; and that of the General Secretary, Mr. Cresswell.

Mr. Ludwig Mond responded, and said he had great pleasure in doing so, as it enabled him to do a little towards helping the society, which as their foreign secretary, he did not do. He thanked them very cordially for the kind way in which they had received his name.

Mr. Watson Smith and Mr. Cresswell also returned thanks.

The Chairman said they had with them that evening two eminent Frenchmen—Monsieur Kolb, whose researches made some thirty years ago upon the chemistry of the Leblanc process they were all acquainted with, and Monsieur Lamy, a son of the eminent French chemist and discoverer of thallium. Their editor had referred to their competitive friends across the Channel. M. Kolb was one of their competitive friends across the Channel, but he was a friendly competitor. He begged to propose their healths.

Mr. Kolb responded in French, and concluded by proposing the toast of "The Ladies," which was drunk with musical honours.

Mr. T. Tyrer proposed "The Newcastle Section," coupling the toast with the name of Mr. J. T. Dnnn.

Mr. J. T. Dunn acknowledged the toast.

The other toasts were "The Health of the Visitors," acknowledged by the Mayor and the Sheriff of Newcastle, and "The Health of the Chairman."

INTERNATIONAL HEALTH EXHIBITION.

Practical Dietetics.

On Friday evening, June 27, Professor de Chaumont delivered a lecture in the Conference room on "Practical Dietetics," especially in relation to preserved and condensed foods. Sir Lyon Playfair, C.B., F.R.S., occupying the chair.

The Professor pointed out the various constituents necessary in food, namely, nitrogenous or albuminoids, carbohydrates, or heat producing foods, including fat, starch, sugar and the like, and mineral salts, not only for assisting in digestion, but also for regulating the way in which the other constituents were assimilated. Besides these, there was another class, the vegetable acids, the absence of which affected the blood very prejudicially and produced scurvy or scorbutic complaints. Milk was long ago found to contain all these essential elements, and was, therefore, considered a perfect food for the young, but not for adults, as it would require nine or ten pints per day to support life. It was a curious fact that almost all dietaries prepared officially, whether for prisons, workhouses or armies, were defective, and the error generally lay in the same direction, namely, a deficiency of albuminoids and particularly of fat. Preserved and concentrated foods were very valuable in many cases, but it was necessary to distinguish between the two, and not suppose that preserved was concentrated, or that a small quantity of it contained a large amount of nourishment. In fact, even in concentrated foods, the statements sometimes made, such as that a lozenge or two would contain enough nutriment for twenty-four hours, were simply romances. A man could not remain in health with less than about one pound of solid food per day, and that meant really water-free food, not what appeared to be dry, like ships' biscuits or flour, which in fact contained a large percentage of water. Beef essences, liquid meat, etc., were next referred to and shown to be rather stimulants than real foods, although they were very valuable in their way. Recently several new methods of preserving food had been introduced by means of salicylic or boracic acids, but to these there seemed to be some objections. Lastly, the importance of a due proportion of fat being eaten was insisted upon, an eminent physician, some forty or fifty years ago, having said that one of the causes of the prevalence of consumptive diseases in England was the high price of butter.

The Chairman, in moving the vote of thanks to the lecturer, pointed out that the albuminoids were exactly of the same composition in the flesh and blood of all animals, and when dried were perfectly indistinguishable even by the chemist. These substances had to be built into the body, it being the work of plants to mould the elements into those forms out of the aërial and other food around them, whilst animals had only to give them a position in their organizations. It was a very common belief that the body was renewed in seven years, but as a matter of fact all the soft parts, such as the muscles, changed in about six weeks, and to supply this constant waste, at least four ounces of flesh forming food must be taken. A man doing hard work, required about an ounce more. To put one pound of flesh upon a man would cost in the shape of meat, 1*s.* 8*d.* or 2*s.*, in potatoes, 1*s.* 4*d.*, but in peas it could be done for about 3*d.* In conclusion, he drew particular attention to a collection in the Central Hall, in which the various constituents of all articles of food were shown.

Conference on Electric Lighting.

A Conference was held on Friday, the 4th inst., at the Health Exhibition, on Electric Lighting in Relation to Health. Professor W. Grylls Adams, F.R.S., President of the Society of Telegraph Engineers, in the chair. Amongst those present were Professor G. C. Foster, Mr. Willoughby Smith and Professor Hughes, F.R.S.

Mr. R. E. Crompton read the first paper. He pointed out in the first place that the conditions of life under artificial light were not so favourable to health as those under sunlight, the causes of this being of a twofold character, those affecting the general health, and those affecting the eyesight particularly, and considering the great proportion of time now spent under artificial light, the importance of this question was very obvious. The electric light approached sunlight more nearly than any other artificial illuminant, and was therefore more favourable to health. All other sources of light, vitiated the air both by abstracting the oxygen, and by loading the atmosphere with watery vapour and the products of combustion; the light given off by them was also deficient in the violet and ultra violet rays, making the light yellow, and being inferior in this respect to the electric light. A table was given showing the comparative heating and air-vitiating effects of eleven different illuminants, cannel gas being at the head of the list next to electricity. The air of a room lit by gas was heated twenty times as much as if the same light were produced by electricity. Each gas burner consumed more oxygen and vitiated the air more than an ordinary human being. At the same time he by no means wished to make an attack on gas, which was far superior to other illuminants, light for light, though in their case the effects were not so noticeable, owing to the small amount of light which people had to be content with. The Birmingham Town Hall having been lit by electricity at the last Musical Festival, printed questions had been addressed to the whole of the orchestra, soloists and chorus, as to the effects, and a few of the replies were read. They all agreed as to the vast improvement, both in comfort, coolness and in freedom from difficulty in keeping the instruments in tune. It was considered by oculists that more than half the affections of sight were produced by insufficient and unsteady light. In both these respects the incandescent electric light was far superior to any other light. For some purposes, however, the arc-light was preferable and was more economical; this had been used for some time in the Glasgow Post Office, and the health, and even the eyesight of the employés had measurably improved, so much so that several who had begun to use glasses were able to dispense with them. The paper concluded with a discussion of some of the objections to electric lighting.

In the discussion which ensued, Mr. J. S. Adams, Mr. Shoolbred, Colonel Malcolm, R.E., Mr. George Offor, Mr. J. Swan, Mr. T. R. Crompton, Mr. Greenhill and Mr. Willoughby Smith took part, the principal points taken up being, not the advantages of electricity, upon which all seemed to be agreed, but the difficulties of supplying it. Mr. Crompton pointed out in reply that people in general had not accommodation for putting up an installation on their own premises, and on the other hand, until they came forward with more capital, central stations from which to supply a district could not be established.

After luncheon, Dr. W. H. Stone delivered a highly interesting address on the "Physiological Bearings of Electricity on Health," in which he dealt chiefly with the necessity for accurate knowledge as to the resistance of the human body to electrical currents, some most astonishing statements on the subject having been published. He detailed the means he had taken for obtaining accurate measurements, and mentioned several instances in which the application of electricity had proved of very great service, particularly in cases of locomotor ataxy and paralysis; in diabetes also considerable benefit was produced for a time, though the effects were evanescent.

After a short discussion, in which Mr. Latimer Clark, Dr. Kilner, Mr. Walker and others took part, a vote of thanks was passed to Dr. Stone and the proceedings terminated.

Communications. Letters, etc., have been received from Messrs. Jones, Wharrie, Mee, Ince, Wright, Fennell, Chemicus.

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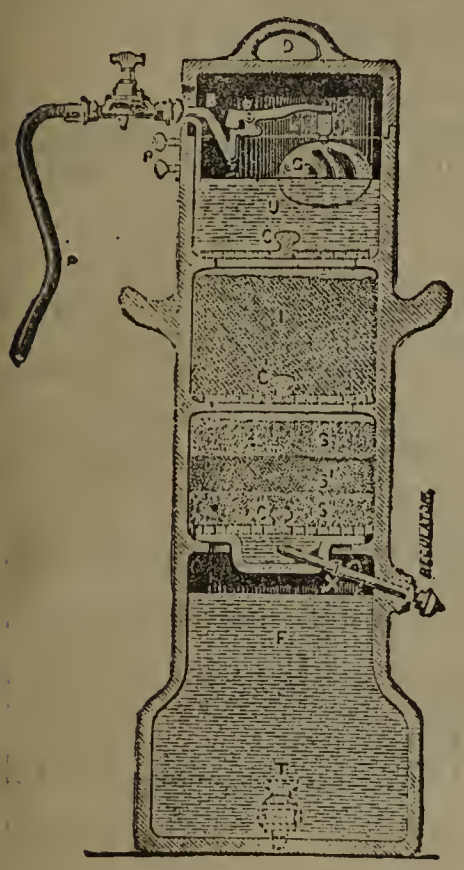

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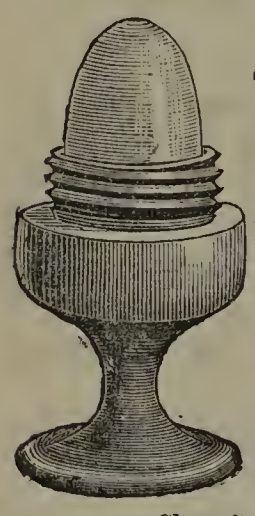

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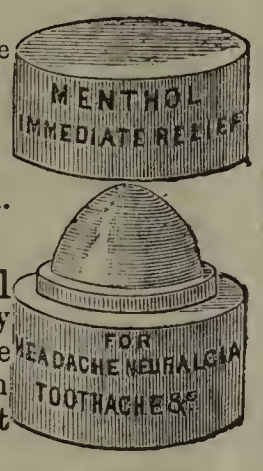

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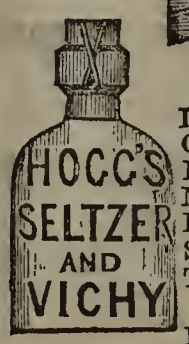

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WESTMINSTER COLLEGE

At the Examinations held this month, the following Students of this College were successful :—

MINOR

Mr. J. E. S. Bunn .....Halstead.
„ C. G. Davies..... London.
„ J. R. Evans .....Dowlais.
„ L. J. W. Jones.....Swansea
„ W. G. Sloan.....Barking.
„ G. Stevenson .....Sutton-in-Ashfield.

No Major Students presented themselves from this College.

The next Session will commence on Monday, September 1st.

Students intending to enter on the above date are requested to send in their names as early as possible, so that benches may be reserved for them.

FEES :—

To the October Examination	...	£5 5s.
To the December „	... ...	£8 8s.
Six Months' Course ...	... ...	£10 10s.
Twelve Months' Course	... ...	£15 15s.

Any diligent Student with ordinary ability, who is punctual in his attendance at the Lectures and Classes, may rely upon passing his Examination at the FIRST ATTEMPT.

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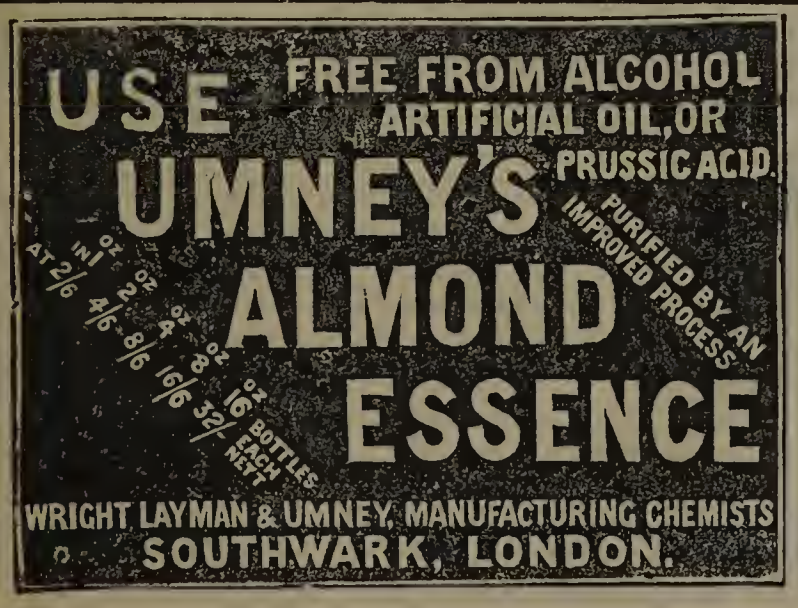

THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, MARYLEBONE ROAD N.W.

The next complete course of lectures and classes will be commenced on September 2nd. Fees to the October examinations, 6 guineas; to December, 10 guineas; to February, 13 guineas; or the entire session, £21. Early entries by intending students are particularly requested, in order that benches may be secured and disappointment thus avoided.

For Prospectus and further particulars apply to

Messrs. LUFF & WOODLAND.

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THE MANCHESTER COLLEGE OF CHEMISTRY & PHARMACY

225, OXFORD STREET, MANCHESTER.

Mr. W. S. TURNER, Pharm. Chemist, &c.

The next Session will begin on August 18th, so as to give more time to Students working for the October Examination. It will include, besides the "*Full-time Classes*," distinct courses of *Afternoon* and *Evening* classes for the Minor and Preliminary, to which the attention of local pharmacists and their employès is especially invited, as no pains are spared to make their work thorough, useful and lasting.

Special note to *Major* men.—For the future, until notice is given, the fee for Major Students will be from half to two-thirds of that paid by the Minors, and a time table can be arranged by which they shall receive full attention *without interfering with the Minor time tables at all.*

P.S.—The average total of Students attending the classes is 30.

The total number of Students who have received instruction at the School during the Session between January and July is 54.

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Mr. JAS. W. SAUNDERS
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Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

FOURTEENTH SESSION, 1883-4.

Entries now begun for the term commencing Sept. next.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

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TESTIMONIAL.

BUCKLEY HOUSE, LLANDUDNO,
March 10th, 1884.

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I am, Gentlemen,
Yours very truly,
M. A. S.

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COMPETENT ASSISTANT. 10 years' good experience. Minor qualification. Good references. Age 24. Height 5ft. 5in. C. RAY, 57, High St., Tunbridge Wells.

AS ASSISTANT. Age 25. Height 5ft. 7in. Good references. C. H. G., 36, Belgrave Gate, Leicester.

FOR month or six weeks.—As ASSISTANT. Good reference. Disengaged. Salary moderate. A. C., 54, Montague Rd., Uxbridge.

ENGAGEMENTS WANTED.

AS ASSISTANT, with view to early purchase, in small London business. East-end preferred. State particulars to R. C., care of Mr. Church, Chemist, 227, Commercial Rd., E.

LOCUM TENENS and TEMPORARY.—Good London and country references. All particulars on application. Present address of R. E. BUNN, is Mr. H. G. Adams, Chemist, Sudbury, Suffolk.

LOCUM TENENS or Temporary ASSISTANT, for a month or five weeks. Age 32. 16 years' experience. Now disengaged. Excellent references. W. M. BAKER, 3, Alexandra Ter., Hailsham, Sussex.

DISENGAGED August 6th.—Temporary. As DISPENSER to Medical Man or Chemist's JUNIOR. Outdoor. Age 23. Good testimonials. Terms moderate. FRANK HEBRON, 1, Green Lane Ter., Kettering, Northamptonshire.

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AS JUNIOR. Over 4 years' experience. Age 19. Height 5ft. 7½in. Where two are kept preferred. Please state hours, &c. A., 9, Rothesay Rd., Luton, Beds.

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AS LOCUM TENENS or MANAGER, by a Pharm. Chemist with first-class experience and highest references. BETA, care of Mr. Burke, William St., Windsor.

AS LOCUM TENENS or Temporary ASSISTANT. Age 29. Qualified. First-class references. Accustomed to good Dispensing business. A. B. C., 84, Isledon Rd., Finsbury Park, N.

AS ASSISTANT. Light Retail and Dispensing. Minor. Age 24. Height 5ft. 4in. N., 69, Victoria St., Grimsby.

TEMPORARY.—By thoroughly competent all round ASSISTANT, of good appearance and address. Age 30. Unexceptional references. Terms 40s. week. SOMERSET, Messrs. Barclay & Sons, Farringdon St., London.

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DAY, week or month.—LOCUM TENENS. Disengaged 17th inst. London and country experience. Minor qualification. B., 34, Bridge St., Cambridge.

AS JUNIOR. Age 21. Height 5ft. 8in. Accustomed to first-class Retail and Dispensing business in a large town. Time for study and attending classes for the Minor allowed. W. J. W. PASS, Princess St., Knutsford.

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ASSISTANTS WANTED.

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IMMEDIATELY.—A Junior ASSISTANT, for a good country trade. Send references, salary required, &c., and if possible, carte, to be returned at once. Also an IMPROVER. Apply, CORFE, Chemist, Maidstone.

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APPRENTICE.—A Pharmaceutical Chemist, by exam., in healthy suburb of a large town in West of England, has a vacancy. High-class trade. All Dispensing and light Retail. Many educational advantages. Address, PHARMACIST, Messrs. Hodgkinson & Co., Upper Whitecross St., London.

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The Pharmaceutical Journal AND Transactions.

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TABLE OF CONTENTS.

Page

Notes on Recent Donations to the Museum of the Pharmaceutical Society. — III. Lukrabo or Ta-fung-tsze. By E. M. Holmes 41
The Galenical Pharmacy of the New Pharmacopée Francaise 41
Absolute Alcohol. By Dr. Squibb (*concluded*) 43
Chemical Constituents of Plants..... 46

EDITORIAL ARTICLES AND NOTES:—

Food Adulteration and Food Analysis 47
Notes:—Medical Acts Amendment Bill—Shaving Cinchona Trees—Hop Substitutes—Oil of Star Anise—American Pharmaceutical Association—The Codex and its Errata—Bisulphate of Quinine—A Home for Worn-out Pharmacists 48

PHARMACEUTICAL SOCIETY OF IRELAND:—

Meeting of the Council 49

PROVINCIAL TRANSACTIONS:—

Manchester Pharmacy Students' Association:—
The Manufacture of Sulphuric Acid. By J. B. Thornley 50

PROCEEDINGS OF SCIENTIFIC SOCIETIES:—

International Health Exhibition:—
Conference on Food Adulteration and Analysis 51
British Pharmaceutical Conference:—
Meeting of the Executive Committee 55
Royal Institution of Great Britain:—
The Physiological Aspect of Mesmerism. By J. N. Langley 56

CORRESPONDENCE:—

Permanganate of Potash Pills with Paraffin, Vaseline and Kaolin as an Excipient 59
The Seed Hair of the Strychnos Nux-Vomica 60
Answers to Correspondents 60

Pharmaceutical Society of Great Britain.

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RICHARD BREMRIDGE, Secretary and Registrar.

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Strongly recommended by the most distinguished Medical Authorities, and being considered a Preparation of the highest merit, is not to be confounded with other makes of the same and similar descriptions.

Chemists introducing the above to their Customers, and particularly to the Medical Profession, will find this Preparation of Malt so highly appreciated as soon to command a constant sale.

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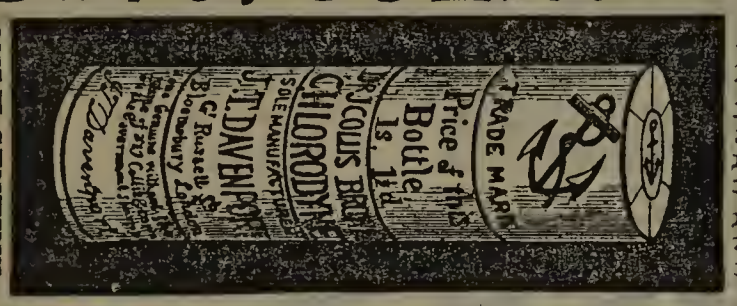

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This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient.

Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

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THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

Apothecaries' Hall	London.	Gale & Co.	London.	Morson, T., & Son,	London.
Allen, Hanbury & Co.	,,	Giles & Son,	Clifton.	Newbery & Sons,	,,
Baiss Brothers,	,,	Goulding, Messrs.	Cork.	Oldham, G., & Co.	Dublin.
Banks & Richards,	Birmingham.	Grattan & Co.	Belfast.	Parsons & Richardson,	Leicester.
Barron, Harveys & Co.	London.	Grimwade, Ridley,	London.	Peake, Allen & Co.	Dublin.
Bell, John & Co.	,,	Grindley & Son,	Chester.	Raimes & Co.	Liverpool.
Corbyn & Co.	,,	Hearon, M'Culloch & Co.	London.	Sang & Barker,	Edinburgh.
Cox & Gould,	,,	Hodgkinson, Tonge & Stead,	,,	Sanger, J., & Sons,	London.
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Dunn & Company,	,,	Lynch & Co.	,,	Tomlinson, Hayward & Co.	Lincoln.
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Evans, Lescher & Webb,	,,	Mander, Weaver,	Wolverhampton.	Westwood & Hopkins,	,,
Ferris & Co.	Bristol.	Marsden & Sons,	London.	Woolley, James,	Manchester.
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After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

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Special Terms for Quantity.

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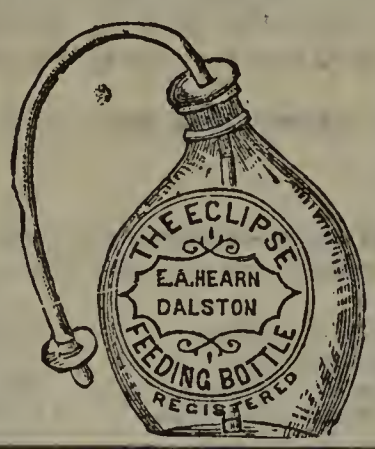

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A POSITIVE CURE
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STOMACH, LIVER & KIDNEY AFFECTIONS.

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The Emulsion is of the consistence of Devonshire cream, easily miscible with fluids, and quite unobjectionable in taste. It may be given in milk or water, and with the addition of a little wine or brandy if desired.

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The quality and flavour are unsurpassed.

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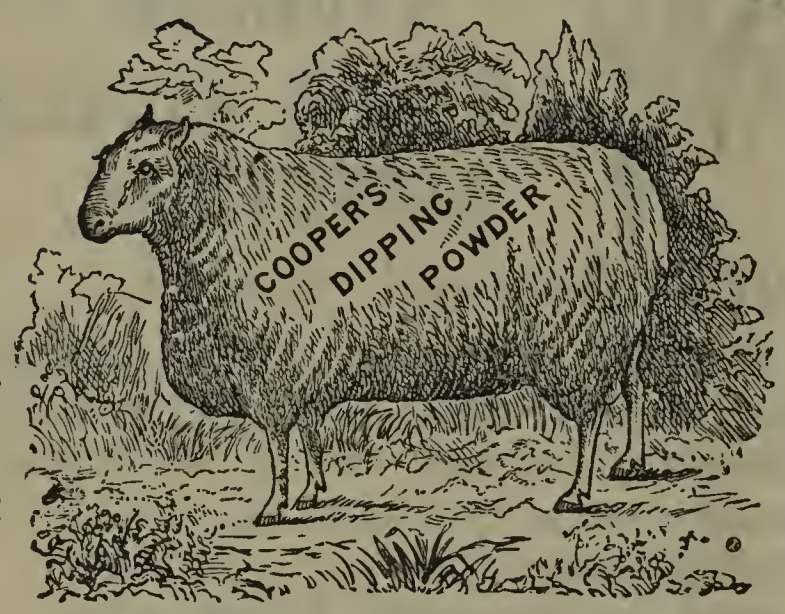

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Is entirely Free of Alcohol.
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Effervescing in all Aerated Waters.
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The Perfection of Fruit Beverages.
Delicious, Cooling and Refreshing
in Water—
Effervescing in all the Mineral Waters

ROSE'S LIME JUICE CORDIAL.
The Favourite Beverage for Lunch,
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Eminently Wholesome. No table
should be without it.

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A Real Summer Delicacy.
Cooling and Refreshing in Water.
Effervescing in all Aerated Waters.
Effectually Quenching Thirst.

ROSE'S LIME JUICE CORDIAL.
The favourite Temperance Beverage;
Delicious, Cooling and Refreshing.
Entirely Free of Alcohol.
Eminently Wholesome.

ROSE'S LIME JUICE CORDIAL.
An excellent Substitute for the Lemon
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Cooling and Refreshing.

ROSE'S LIME JUICE CORDIAL.
Is highly Medicinal,
Cooling and Purifying the Blood.
An excellent Stomachic,
Assisting Digestion.

ROSE'S LIME JUICE CORDIAL.
No Beverage has received higher
recommendations from
the Medical Profession as eminently
wholesome.—See *Lancet*.

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The Family Dinner Table
has additional attractions
when supplied with
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Non-Alcoholic.
It has now
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As a protection against imitations,
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It has been decided
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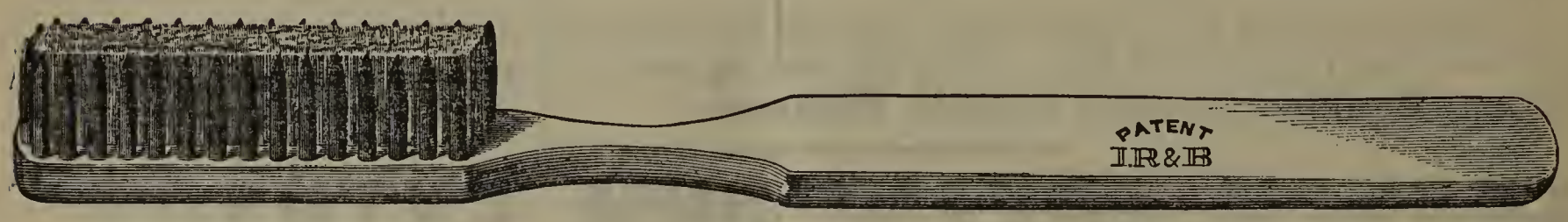

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From *The Journal of the British Dental Association,* January 15, 1884.

NEW INVENTIONS.

Messrs. MAW'S PATENT I. R. & B. TOOTH BRUSHES.

We have received from Messrs. Maw & Co., of Aldersgate Street, specimens of a new pattern tooth-brush, with the above designation, which they are about to bring under the notice of the profession. The initials refer to the "India Rubber and Bristles," of which the brushes are composed. They consist of a narrow bristle brush of the ordinary type, surrounded by a single row of stems of soft red rubber of nearly the same length. They are both efficient and pleasant to use, and we should anticipate that the superior durability and elasticity of the rubber will afford so much support to the bristles as to keep them in shape and working order for a much longer time than an equally soft ordinary bristle brush would wear. The chief object of the rubber addition is, however, to prevent abrasion of the gums, and it appears to answer this purpose very satisfactorily. To persons with tender, or partially edentulous mouths, brushing the teeth is an unpleasant and even painful operation; Messrs. Maw's brushes will certainly reduce the discomfort in such cases to a minimum.

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NOTES ON RECENT DONATIONS TO THE MUSEUM OF THE PHARMACEUTICAL SOCIETY.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

III.—LUKRABO OR TA-FUNG-TSZE.

In the interesting papers on "Chinese Materia Medica," by the late Daniel Hanbury, published in the *Pharmaceutical Journal* ([2], vol. iii., 1862), a seed is described and illustrated under the name of *Ta-fung-tsze*, which he conjectured to be allied to *Chaulmugra*. This seed is largely used in China in skin diseases and leprosy, and appears to have been employed in that country for at least three hundred years, since the tree affording the seed is figured in the old Chinese herbal, 'Puntsaou,' published A.D. 1596. The tree, however, has up to the present time been unknown to botanists.

The *Ta-fung-tsze* is still an article of considerable commerce, figuring in the Consular Blue Books under Chinese imports by the name of *Lukrabo*. As much as 48 piculs (6400 lbs.) of the seed were exported from Bangkok to China in 1871. It is also exported thither from Saigon in Cochin China. The seed in question is about half the length of *Chaulmugra* seed, but of equal diameter. The shell is thicker and harder, and at one end is marked with a few radiating slightly raised ridges, whereas that of *Chaulmugra* is quite smooth.

Dr. Porter Smith, in his 'Chinese Materia Medica' (1871), p. 140, describes these seeds under the name of *Lucrubau*, and he also considers them as a variety of *Chaulmugra*. He states that they are described in Chinese books as being good for leprosy, lepra, itch, pityriasis, psoriasis, syphilis, lipoma, vermes, and chaps upon the back of the hands, and that calomel and the seeds of *Robinia amara* are used with the *Lucrubau*, both externally and internally, in the treatment of leprosy. In the northern province of Hupeh the seeds are in great repute as a remedy for parasitic pediculi and the itch insect. In Soubeiran's 'Matière Médicale chez les Chinois' (p. 221), the seeds are erroneously referred to *Gynocardia odorata*.

In the Kew Report (1878, p. 33) the seeds, under the name of *Dai-phong-tu*, are said to be used in Saigon as a vermifuge after the extraction of the oil. It is added that M. Pierre has successfully raised some seeds of the plant, and refers it to the genus *Hydnocarpus*. The species, however, is not mentioned in the Kew Report and no further information has appeared in it upon this point in subsequent years. Having had a specimen of the *Lukrabo* seed in the Museum of the Pharmaceutical Society for some years—without a specific name—I recently wrote to M. Pierre for information as to the species yielding the seed. In response he has kindly forwarded for the herbarium of this Society a specimen of the plant with flowers and seeds, and the following interesting statement:—"It is a new species which I have named *Hydnocarpus anthelminthica*, Pierre. It is very nearly allied to *H. alpina*, Wight, p. 940, but its leaves are more linear-oblong. The scales opposite to the petals are less long and more ciliated, the stigma is furrowed in its whole extent, and is only toothed towards the extremity of its reflexed margin, while in *H. alpina* it is furnished with large lobes. The male flower contains a rudimentary ovary; in the female flower this is pyramidal. The seeds are used as a vermifuge by the Annamites. The names given in Annam to the plant are *Dai-phong-tu* and *Thaoc-phu-tu*. The specimen sent was gathered in the province of Bien Hoa in Southern Cochin China."

A figure of the tree will, I presume, be given in the magnificent 'Forest Flora of Cochin China,' now being published by M. L. Pierre under the auspices of the French Government.

The botanical source of this important eastern drug is thus at last satisfactorily cleared up. Some other very interesting specimens received for the herbarium at the same same time from Dr. Pierre may be noticed on a future occasion.

THE GALENICAL PHARMACY OF THE NEW PHARMACOPÉE FRANÇAISE.

(*Continued from Vol. XIV., page* 1008.)

A second edition of the New Codex has appeared, and these remarks on the section relating to pure pharmacy are based upon the alterations that have been introduced. The observations here presented are intended to be explanatory and to give information to the English reader; and no attempt has been made to measure the formulæ of another country by the standard or the requirements of our British Pharmacopœia.

Galenical pharmacy constitutes the third division of the volume; is distinguished by the red edging of the leaves; and occupies nearly three hundred pages. It includes, according to the amended statement, such official medicaments as the pharmacien should always prepare according to the Codex.

It has been objected that the list of substances from the vegetable and animal kingdom does not contain all those which form part of the ingredients ordered subsequently in the galenical preparations. Aware of this deficiency the Commission of Revision has add le cédrat, of which there is a tincture; le cerfeuil (chervil); le drosera; les stigmates de mäis; le poivre long, as a companion to *Piper nigrum*; le suif de bœuf (beef suet); and l'essence de térébenthine, described as a volatile oil obtained by distillation from various turpentines. About ten more substances are wanting in the list to complete the technical accuracy of the New Codex.

Analysis, as hitherto practised, has failed to reveal the exact composition of mineral waters, and it has therefore been deemed unadvisable to retain formulæ by which they may be artificially prepared. The entire chapter on "Les Eaux Minérales Artificielles," of 1866, has been remodelled in this respect, that the various official saline solutions, aërated or not, are considered simply as medicaments and no longer as representing certain well-known waters, such as those of Vals, Vichy, Spa and Baréges. The change is due to the more rapid means of transit, by which these natural waters can be obtained in fairly good condition.

Acide Azotique Alcoolisé, the French sweet spirit of nitre, has always been noted for its charming simplicity; of its chemical value some doubt may be entertained. One part nitric acid, diluted to equalize the strength of the old formula, is added to three parts of alcohol in a stoppered bottle. Shake occasionally for two or three days and keep for use.

Acide Sulfurique Alcoolisé, better known by its popular name of Eau de Rabel, remains unchanged.

Alcoolats, *Alcoolatures* and *Alcoólés* are terms to which a definite signification is attached.

Alcoolats are the result of the distillation of one or more medicinal substances with alcohol, and hence are Simple or Compound. The first class have been replaced by solutions of essential oils in alcohol, under the name of Teintures d'essences, of which those of mint and rosemary form examples. They correspond to our word Spirit. In such case they are not distillates. The Compound are distilled preparations with previous maceration. They bear familiar names, such as Alcoolat (or Baume) de Fioravanti, de Garus (Aloes, Myrrh, Cloves, Cinnamon, etc.), de Mélisse Composé (Eau des Carmes), and the old Vulnerary Balsam. This latter, when simply infused in alcohol at 80°, is included amongst the alcoolatures. Alcoolatures are the result of the distillation of plants, fresh or dried, with alcohol. Alcoolature de Digitale now heads the series, the remainder being for the most part prepared in the same manner. In Alcoolature d'Aconit the root collected after inflorescence has been recommended in preference to fresh leaves gathered at the commencement of inflorescence. In the Sirop d'Aconit the root is now ordered.

Alcoolés correspond to our term Tinctures, and are made with alcohol, as distinguished from Ether Tinctures or Éthérolés. They are simple or compound, and in their preparation, solution, maceration and lixiviation are employed. By "lixiviation," percolation must be understood and not the English acceptation of the word. Alcohol being poured on the substance reduced to moderately fine powder, so as to damp the mass, maceration is resorted to for four and twenty hours. Fresh alcohol being added, the process is continued until five parts by weight of liquid have been obtained for one of material. Filter. The alcohol used must be of appropriate strength, 60°, 80° or 90 as indicated.

Ethérolés or, *Teintures Étherées* are made by simple solution as in the Éthérolé de Camphre 1:9. This preparation is better known as Éther Camphré. Or maceration is resorted to as in Éthérolé d'Asa-fœtida, 1:5. Macerate ten days and filter. Balsam of Tolu, resins and gum-resins are treated in the same way. Lastly, percolation called, as already explained, in French pharmacy, lixiviation, is employed, as in Cantharides 1:10 (*Acetic* Ether); Castoreum, 1:10. Digitalis, Belladonna, Conium, Hyoscyamus (leaves.) and Valerian (root); 1:5 respectively.

Apozèmes correspond to our Decoctions, and like them are prepared extemporaneously and are therefore called Magistral. In Apozème Blanc, the old Decoctum Album of Sydenham, tricalcic phosphate (10 grams to a litre) replaces the calcined hartshorn (Corne de Cerf.) The Apozème Antiscorbutique is omitted; and distilled water is ordered to be used throughout.

Medicated Baths are not in our province; the word *artificiel* has very properly given place to the word "*dit*" which exactly expresses the intention of the formula. We have thus, "Bain dit de Plombières;" "Bain dit de Vichy" (Sodæ Bicarb. 500 grams); and one occasionally inquired for by French visitors to England—

Bain dit de Baréges..

Sodium Sulphuret, crystals . . .	60 grams.
Sodium chloride (pure)	60 grams.
Dried Sodium carbonate	30 grams.

Pharmacists will find it an advantage to keep the sodium sulphide separate, and add when required. It is made by passing H_2S through liq. sodæ (caustic) to saturation. Collect the crystals; drain them well and keep.

Cachets are a new introduction described as sheets of unleavened bread cut to a round or oval shape with a flat rim and concave towards the centre, the concavity being intended to receive the powder to be taken. Our wafer paper answers the same purpose. With them may be included the various *Papiers* or *Tissues*. Papier à Cautères, the efficacy of which depends on Turpentine, is no longer aromatized with Balsam of Peru; Papier dit Chimique, the composition being spread on paper rendered waterproof, is unchanged; Papier Épispastique, Turpentine being now omitted, is made with the following formula as a base—

Charta Epispastica.

Mutton-suet	240 grams.
Benzoinated Lard	360 grams.
Cantharides	100 grams.

The tissue is made of three strengths, No. 1 the weakest, composed of 360 grams of the above pommade properly diluted; No. 2, composed of 450 grams; and No. 3, of 600 grams with the simple addition of 60 grams white wax. Papier Goudronné, or Poor Man's Plaster, is unaltered; while Papier au Garou (*Daphne Gnidium*) has disappeared.

Capsules are prepared after an amended formula, powdered gum arabic and honey having been replaced by better materials. The composition may vary, provided that the medicine does not act on the capsule, that the latter may be dissolved in the digestive canal, and that it be made of harmless materials.

Capsules.

Colourless Gelatine (the grénétine mentioned in the chemical section)	25 grams.
Glycerine	10 grams.
Sugar	8 grams.
Distilled Water, about	45 grams.

Dissolve in a water-bath. Plunge into this solution small olive-shaped mouldings of tinned iron, slightly oiled, and fixed on a tray by means of a thin wire. Withdraw the tray after a few seconds and give it a circular movement until the gelatinous matter has slightly cooled. When dry enough, quickly pull off the capsules and trim with scissors. In order to fill the capsules place them on supports—holes pierced in a wooden board, and introduce the liquid by means of a thin pipette. Close each capsule with a drop of warm gelatinous solution, and to complete the union plunge the capsules once more into the solution to about a fourth of their length. Dry in the open air or a moderately heated stove.

A special instrument is needed for capsules containing very volatile medicines known under the name of *Globules* or *Perles*. Ether; ethereal tinctures, essence of turpentine and chloroform may be thus treated.

Cataplasmes correspond to our word Poultice; the Cataplasme de Fécule is made with potato starch; a very useful preparation, Cataplasme Calmant (poppy-heads and henbane) has been withdrawn.

Caustiques. — The Caustics are divided into Escharotiques, strong; and Cathérétiques, milder preparations. The former was the old general title, including various caustic powders now wisely omitted. Extreme exception has been taken by French critics that Caustique de Potasse et de Chaux

should have been made the heading under which both Caustique de Filhos and Caustique de Vienne are placed. The clearness of the arrangement must commend itself to an impartial reader, as they are but modifications of the same formula and not likely to be confused by a pharmacien who will consent to read the directions given.

Cérats. — Cerates do not require description. Some readers may be interested in the two following formulæ, neither of which are new:—

Cold Cream.

Spermaceti	60 grams	= 12.
White wax	30 „	6.
Oil of Almonds	215 „	43.
Rose water	60 „	12.
Tinct. Benzoin	15 „	3.
(1 : 5 sp. rect.)		
Otto of Rose	10 drops	= 2 gtt.
(increase of 4.)	M. S. A.	

Lip Salve.

[Cérat à la Rose.]

White wax	50 grams	= 5.
Oil of Almonds	100 „	10.
Carmine	50 centigrams	= ·5.
Otto of Rose	10 drops	= 1.

(*To be continued.*)

ABSOLUTE ALCOHOL.*

BY DR. SQUIBB.

(*Concluded from page* 25.)

The distilling apparatus consisted of a globular wide-necked flask of about 5 litres capacity, in a water-bath with very little water. This flask was furnished with a large rubber stopper with three tubes—one for a charging tube that passed down to the bottom, and was controlled outside by a rubber tube and pinch-cock;—another for thermometer, and a third large tube leading the vapour to the condenser. The condenser was a tube of block tin passing through a long wooden trough capable of holding a plentiful supply of broken ice. The end of the condenser was connected by rubber tubing with one tube of a tapering rubber stopper of two tubes—the stopper of a size to fit the specific gravity flasks. The second tube of this stopper was connected with the water pump by rubber and glass tubing. The flasks having been well rinsed with absolute alcohol, and the large one connected by the ingress tube with a double air-drying apparatus of sulphuric acid and chloride of calcium, a current of dried air was drawn through the whole apparatus by the pump during an hour or two. Then the ingress tube was connected with the alcohol bottles, one after the other, and the milky alcohol from the shaker was drawn in by the pump, free from any but the very fine particles of lime which refused to settle out with the coarser ones. When charged and properly closed, and the mercurial gauge of the pump showing a partial vacuum of 15 to 23 inches, the water of the bath was warmed up until the liquid boiled,—explosive boiling being prevented by platinum scraps and pieces of tobacco pipe-stem. An apparent boiling always preceded the true boiling from the very commencement of the warming, and was always quite active, thus freeing the alcohol from air, ethers, etc.; and during this bubbling the condenser was not cooled with ice, so that the pump was allowed to take off all these vapours before the true boiling point was reached. This true boiling point varied between 49° and 55° C. according to the vacuum. The first distillate was received in a 100 c.c. flask until this was filled. Then the two rubber tubes connected with the stopper were closed with pinch-cocks, the filled flask taken off, and replaced by one of the specific gravity flasks. The tube leading to the pump was then opened, and the flask exhausted until the pump gauge had again reached 20 to 23 inches. Then the tube from the condenser to the flask was opened. The boiling and condensation having continued during this changing of receiving flasks, a considerable quantity of condensed liquid flows at once into the newly placed flask, and then the distillation proceeds until another change is required.

In this way the specific gravity flasks and others are filled until about five or six fractions are obtained at each distillation, the process being stopped while there is yet 100 c.c. or so in the distilling flask. This residue is thrown away, and the flask well rinsed out with the absolute alcohol and dried by a current of dried air as before, when it is ready for a new distillation. No lime, nor any other sensible impurity was ever found in any of the distillates, and they all, with the possible exceptions of the first two, consisted only of the alcohol and the traces of water still held. All the distillations were managed in this same way from first to last.

By the first distillation the specific gravity was only reduced by about a unit in the fourth decimal place. That is, the alcohol was about ·79394 at the start, and was ·79383 at the end, and the different fractions differed materially. The result not being as low as was occasionally seen on the large scale of manufacture with less precaution, the cause of this was to be sought for. On several occasions during the years 1882 and 1883 large quantities had been seen as low as ·79364, ·79639, ·79375, etc.

The only discoverable difference was that on the large scale the liquid distilled was comparatively free from suspended lime, whilst in this distillation it was almost of the appearance of milk from suspended particles of lime.

From this circumstance a conclusion was reached, upon general chemical principles, that there must be a point at which the affinities of the alcohol and the lime for the water were balanced, and that this balance was constant only for a constant temperature. That when the two were left together, each having its share of the water for the lower temperature, and the temperature was then raised, a dissociation occurred, the alcohol taking back from the lime some of the water it had given up at the lower temperature, forming a new balance for the new temperature.

The same alcohol, with a sufficient addition from the original supply to make up the losses, was again subjected to the same treatment as before, only that after the shaking it was allowed forty-eight hours or more to settle. But, being as milky-looking as before, it was filtered by aspiration with the pump through a large chloride of calcium jar filled with the caustic lime resting on a plug of glass wool. The filtrate was returned without contact with undried air until it came through very nearly clear, and was then drawn into the distilling flask until the charge was obtained; the filtration requiring about a week by reason of the nearly impervious stratum of very fine lime which formed in the filter.

This time the distillate came off at ·79349 and ·79350, and when the fractions, excepting the first and last, were mixed together the specific gravity was ·79350. This distillation left an oily-looking stain upon the distilling flask, which, with other circumstances, led to the conclusion that some impurity in the lime had been washed out by the alcohol, and that thus the distillate might be rendered less pure and clean than it should be.

The total distillate was therefore discarded, and a fresh supply taken having a specific gravity at the start of ·79387, and this was put through the same process, only that it several times nearly ceased to pass through the lime filter, and it became necessary as often to uncover the lime to break up the impervious crust, and thus expose the alcohol and the lime to the ordinary air of the room in damp weather. The distillation from this

* From *Ephemeris*, May, 1884.

charge was, as anticipated, of high specific gravity, namely, ·79365, or not much lower than at the start, but the alcohol was clean and good.

The same alcohol, with a portion from the original supply to make up losses, was put through the process, but the shaking was much diminished in time, so as to have less finely divided lime to obstruct the filtration, and less lime was used. Another, and very much larger lime percolator was set up and charged with ground lime from which all the very fine particles had been sifted out. This percolator was of the capacity of about 5 litres. and held about 2 to 2·5 kilograms of the lime, and was fitted with an air-tight cover in which was a hole fitted with a rubber stopper with two tubes. Two 5 litre bottles were fitted with good stoppers, through which passed two tubes, one to the bottom of the bottle and the other just through the stopper. The outer end of each tube was fitted with a short piece of rubber tubing and a pinch-cock. Both bottles having been filled with desiccated air, the long tube of one was connected to the lower end of the lime percolator in such a way as to be controlled by a pinch-cock, and so that the rate of dropping from the percolator could be seen and controlled. Then the milky alcohol from the shaker was drawn over from the bottle on to the lime percolator by a syphon controllable by a pinch-cock, and the air which entered the bottle as the alcohol ran off was supplied from the desiccator. The alcohol was passed through the percolator at the rate of about a drop a second, and was supplied on top at a similar rate; so that about twenty-four hours was required to pass a charge through the lime. When the bottle at the top of the percolator was empty the one below it was two-thirds filled, and the lime was full of the alcohol, with a thin stratum above it. The pinch cocks were then closed, the full bottle placed at the top of the percolator, and the empty one with dried air was put in its place below, and the apparatus started as at first. In this way the alcohol was passed through the lime twice with a much diminished exposure to undried air. The charge was then aspirated into the clean, dry distilling apparatus by means of the pump, and distilled in fractions as before. The result was, that it all, excepting two small fractions, one at each end which were not weighed, came over at ·79349 to ·79353.

This alcohol, without the further addition of lime, and with the least practicable exposure to air, was passed through the lime percolator eight times, and then distilled. It then gave a specific gravity of ·79350. Weighed at 15° C. and compared with water at 4° C. as unity, the apparent specific gravity was ·79348. This, corrected for expansion of glass, gives a true specific gravity of ·7932618.

A new portion of lime was then slaked with the smallest quantity of water that would reduce it to a fine dry powder. This powder was then calcined at a red heat for about seven hours and, while still warm, 100 grams of it was put into each of two bottles, carefully supplied with dried air. On to this lime about 2 litres of the alcohol of the last distillation was drawn through the lime percolator. The bottles were then put into the shaker and were shaken three times, at intervals of an hour or two, for about ten minutes each time. They were then allowed to settle for twenty-four hours, but still remained milky. The alcohol, as free as possible from the settled lime, was then passed four times through the same lime percolator as before, coming off entirely clear and bright after the second time. It was then aspirated into the distilling flask and distilled as before. The specific gravity was at 4° C. compared with water at 4° C. ·80256. At 15 6° C. compared with water at 15·6° C. it was ·79351.

This terminated the series of distillations, because it was concluded that the best results by the use of lime and the described management had been reached, and not because the alcohol had been entirely dehydrated.

That it was not entirely dehydrated was probable, from several considerations. First, both lime and alcohol form definite combinations with water, and at very low degrees of hydration it is highly probable, at least, that each will take water from the other until a balance of affinities be reached, so that both the lime and the alcohol form complex molecules of two, three or more molecules of lime or alcohol to one of water, constant only when together, under constant conditions of temperature and pressure.

Many of the authorities on absolute alcohol state that in the distillation of the alcohol after dehydration, only the middle portions of the distillate are anhydrous. This statement is difficult to comprehend. It is impossible to understand how, in the distillation of alcohol which contains any water at all, the first and last portions should come over hydrated and the middle portion anhydrous. These distillations only appear to show this, while the truth must be that the middle portions are only a little less hydrated than the two end portions. No completely anhydrous alcohol will be reached until the distillate is of the same specific gravity from beginning to end. The writer's experience has shown that the lower the specific gravity the more uniform was the distillate throughout; but he never reached a point where, if carefully weighed in the large bottle, there was not a slight difference between the ends and the middle of the large distillations of 4 litres at a time, requiring an entire day for the process. In his best results the difference was pushed back to the fifth decimal place, but it was always perceptible.

Again, it was not possible to manage the whole prolonged process and manipulations without some slight admissions of undried, or only partially dried, air, and as the lower hydrations were reached it became very plain that so very strong was their affinity for moisture that very trifling admissions of undried air through a joint that would leak only a few small bubbles into the apparatus before discovery, would raise the specific gravity perceptibly. Although such admissions were reduced to a minimum during the later distillations they were not altogether prevented, and their reduction was effected after the lime percolator had been so long used as to need a renewal of the lime. It seems quite certain, therefore, that undried air has a very important influence, and that it was not wholly excluded in any of the distillations, and also that towards the end the effectiveness of the lime percolator was diminished.

From all these circumstances it is safely concluded that anhydrous alcohol was not reached; and that if two or three weeks more could have been spared to the work, with a renewal of the lime, and the lime better calcined, slightly lower results might have been reached even by the use of lime. Furthermore, the weather had become warm, and the air loaded with moisture, a condition recognized for many years past, in actual experience on the large scale, as being very unfavourable to the management of the process for absolute alcohol. Clear, cold weather, with a high barometer and low dew point, often makes a favourable difference of one or two-tenths of a per cent. in the result of a large distillation, even before the loss of strength inevitable in bottling the distillate.

The alcohol which resulted from these distillations was critically examined, and seemed to have all the sensible and chemical properties of pure and unchanged alcohol, except that it did not entirely resist the reaction of nitrate of silver. By prolonged contact even in diffused daylight the nitrate was very slowly and continuously reduced, so that in three or four days a scanty black precipitate was visible, and this seemed to increase slowly as long as it was under observation. It is possible that the contract with the rubber tubing and stoppers in the distillation may have been the cause of this very slight reaction, but in every case it affected the tint of

the alcohol within eight or ten hours. It seems almost certain that permanganate of potassium decomposes pure alcohol more rapidly as the strength increases beyond 97 or 98 per cent. and it is possible that nitrate of silver does the same.

The distillation in 23 inches of a vacuum insured the absence of ethers, etc., of low boiling point, which might have been accidentally produced, and the most cultivated senses of professional experts in wine and spirits failed in detect any of the substances of higher boiling points. The only test not applied to it was that of combustion, and this was not resorted to, because several observers to the past have verified their results by repeated combustions of their alcohol, when it is now known that such alcohol must have contained water. To make such combustions that would be entirely trustworthy is very difficult indeed, and the writer would be quite incompetent to such work where such extremely accurate weighings are required, with such a difficult substance, containing so very small a proportion of water only.

Nine distillations were made, of which the principal ones only are given, and over one hundred and twenty weighings, and many of them were very successful.

Taking the 15·6° C. standard for unity, and weighing at this same temperature, and without other correction for buoyancy of air than that by the use of a counterposing flask, two specific gravities of ·79349 were obtained, three of ·79350 and three of ·79351. The mean of these eight successful weighings is so nearly ·79350 that this number is accepted as the present specific gravity. Over twenty weighings were obtained below ·79367. Alcohol of a specific gravity of ·79350 at 15·6° C. gave at 4° C. compared with water at 4° C. as unity, a specific gravity by careful observation of ·802566. At 15° C. compared with water at 4° C. the apparent specific gravity was ·79348. This corrected for expansion of glass, gave ·79326. At 15·6° C. compared with water at 4° C. the apparent specific gravity was ·79301. This corrected for expansion gave ·79279. At 25° C. compared with water at 4° C. the apparent and corrected specific gravities were ·78557 and ·78496; and at 25° C. compared with water at 15·6° C. as unity, the apparent and corrected specific gravities were ·78591 and ·78573.

Similar lines of weighings, with the exception of that at 15° C., were then made with combinations of this alcohol and recently boiled distilled water. The first with 99 per cent. by weight and 1 per cent. of water. Then 98 per cent. and 2 per cent. water; then 96 per cent., and then at intervals of 4 per cent. down to and including 40 per cent. alcohol and 60 per cent. water, and a table is submitted below of these actual weighings. The column of 15° C. compared with water at 4° C. has only four weighings, the remaining figures being the result of interpolations based upon four weighings. All the specific gravities were weighed and are stated to the fifth decimal place, but the last decimal is only given for its effect upon the fourth, for it is not pretended that any ordinary balance or management will give correct figures for the fifth decimal place, even when a specific gravity flask so large as 500 grams is used.

The columns under the head of corrected specific gravities are corrected simply for expansion of the glass flask, and for the sake of those readers who may, like the writer, be no algebraists, and yet who may wish to make such corrections of apparent or observed specific gravities,—the arithmetical rule for correction may be given.

The cubic expansion or holding capacity of ordinary glass vessels is increased by heat at the rate of ·000025 of its capacity for each degree of the centigrade scale, and therefore a flask which holds 1000 grams of water at 4° C. will hold 1000·025 grams at 5° C., or (025 × 11 =) 1000·275 grams at (4° + 11° =) 15° C. Therefore, the expansion for 1° C. must be multiplied by the number of degrees of difference in temperature between that of the standard volume for unity and that at which the weighing is made. This gives the total correction for unity. This must be multiplied by the number of units of weight which the flask may hold in order to get the total correction to be applied to any given flask. Suppose a flask which holds to the mark exactly 500 grams of water at 4° C., be filled to the same mark with alcohol at 15° C., and is then found to contain 396·75 grams of the alcohol. The correction for unity being ·000025 for each 1° C. and the difference in temperature between the standard of volume, namely, 4° C., and the volume at the weighing, namely, 15° C., being 11° C., the ·000025 multiplied by 11 gives ·000275, which is the total expansion per unit. Then as there are 396·75 units, this multiplied by the ·000275 gives ·10910625 as the total correction to be subtracted from the weight of the alcohol, because the flask by expansion through 11° C. of temperature holds ·109+ gram more than it does at 4° C. Then by the common rule that a decimal fraction of 5 or more than 5 in one decimal place is to be carried as a unit to the next decimal place to the left, while one of less than 5 is to be dropped—this correction becomes practically,—not ·1091+, but ·11. This subtracted from 396·75 gives 396·64 as the weight of the volume of this alcohol, which is exactly equal to the volume of water at 4° C., and this is therefore the volume corrected for expansion of glass vessel. Now, if this series of figures be doubled, the capacity of the flask for water at 4° C. will be 1000 instead of 500. The alcohol will weigh (396·75 × 2 =) 793·50, instead of 396·75, and this with the decimal point moved three places to the left will be the apparent specific gravity, because the figures 1000 are to be converted into unity of 1·000. Then the correction will be (11 × 2 =) 22 instead of 11, and this correction applied to the 793·50 will reduce it to 793·28, and the moving of the decimal point three places as before, which is equivalent to dividing the number by 1000,—gives ·79328 as the true or corrected specific gravity of this alcohol at 15° C. compared with water at 4° C. It will now be seen that the figures 793·50, whether taken as 793·50 or ·79350, equally represent the accurate weight of alcohol to which the correction is to be applied. But these figures also represent the apparent specific gravity, and, therefore, as a short cut across all this roundabout analysis of the operation, the following simple rule by which to correct for expansion of glass, is reached.

Multiply ·000025 by the number of degrees of difference between the temperature of the standard volume for unity and that at which the liquid is weighed, for the total correction for unity. Then multiply the apparent specific gravity by this total correction for unity, to obtain the total correction for the whole quantity. Subtract this from the apparent specific gravity, and the result will be the corrected specific gravity.

By this rule the corrected columns of the table are all obtained.

To all those thoroughly educated persons who can comprehend the algebraic formula $V' = V\ (1 + Kt)$, as this writer cannot, the above explanation, and much of the preceding detail will seem prolix and useless. But so many are still to be found who are puzzled, confused and obstructed by algebraic formulas who yet have the appetite for such work, and the capacity to do it with care and patience, that it has been thought worth while to go into much detail in this paper, which will be surplusage of the poorest kind to many readers.

When examined by the differences the results given in this table are only in fair practical accord, and are entirely wanting in the regularity of a mathematical table. The discords are mainly confined to the fifth decimal place. They often reach the fourth decimal place, but never the third, and these differences have a curious wave or curve which reaches its maximum between 64 and 68 per cent. When compared with the older table of the writer, published in a former paper, this curve is quite marked, and very strongly

suggests a curvature in the line of expansion of combinations of alcohol and water by heat, but the observations were not sufficiently accurate to be trustworthy at the decimal place of hundred thousandths, and make no pretension to such accuracy. They are given simply because they occur naturally in weighing to centigrams with a 500 gram specific gravity flask, and to give a certain indication of the value of the figure in the preceding decimal place. The lower and more important specific gravities for absolute alcohol were all taken with the flask described in this paper, and are believed to be quite trustworthy. But three of the dilutions were made with the 500 gram flask illustrated at page 353 of a former number of these pamphlets, and are less accurate.

The entire subject well merits a more thorough and careful investigation, and if this paper should awaken an interest in it in some one with more ability and time than this writer has, it will serve a very good purpose indeed.

Alcohol Table.

Showing the specific gravities of combinations of alcohol and water, ascertained by actual observations at intervals of 4 per cent., on the new basis for absolute alcohol of specific gravity ·79350, at 15·6° C.=60° F. compared with water at 15·6° C.=60° F. as unity; and showing both the apparent and corrected specific gravities at different temperatures by the two common standards for unity, namely, water at its maximum density of 4° C.=39·2° F. and at 15·6° C.=60° F. The table is sufficiently correct to be practically useful to the fourth decimal place.

Per cent. by Weight.	Compared with Water at 4° C.=39·2° F. as Unity.							Compared with Water at 15·6° C.=60° F. as Unity.		
	Weighed at—							Weighed at—		
	4° C.= 39·2° F.	15° C.=59° F.		15·6 C.=60° F.		25° C.=77° F.		15·6° C.= 60° F.	25° C.=77° F.	
	True.	Apparent.	Corrected for expansion of glass.	Apparent.	Corrected for expansion of glass.	Apparent.	Corrected for expansion of glass.	True.	Apparent.	Corrected for expansion of glass.
100	·80257	·79348	·79326	·79301	·79279	·78537	·78496	·79350	·78591	·78573
99	·80579	·79667	·79645	·79618	·89595	·78847	·78806	·79669	·78901	·78882
98	·80875	·79965	·79943	·79893	·79870	·79131	·79089	·79967	·79205	·79186
96	·81467	·80555	·80533	·80509	·80486	·79744	·79702	·80558	·79801	·79782
92	·82593	·81680	·81658	·81631	·81607	·80865	·80823	·81684	·80915	·80896
88	·83649	·82751	·82728	·82699	·82675	·81929	·81886	·82755	·81982	·81963
84	·84681	·83770	·83747	·83719	·83695	·82953	·82909	·83775	·83007	·82987
80	·85683	·84773	·84750	·84718	·84694	·83959	·83915	·84779	·84021	·84001
76	·86655	·85742	·85718	·85699	·85674	·84937	·84892	·85749	·84991	·84971
72	·87600	·86702	·86678	·86649	·86624	·85895	·85850	·86711	·85953	·85933
68	·88516	·87655	·87631	·87607	·87582	·86847	·86801	·87665	·86905	·86885
64	·89479	·88625	·88601	·88578	·88552	·87832	·87786	·88636	·87884	·87863
60	·90401	·89549	·89524	·89556	·89530	·88766	·88719	·89561	·88821	·88800
56	·91297	·90452	·90427	·90405	·90379	·89687	·89640	·90465	·89745	·89724
52	·92177	·91349	·91324	·91309	·91283	·90597	·90549	·91365	·90653	·90632
48	·93045	·92231	·92206	·92187	·92160	·91489	·91441	·92247	·91547	·91525
44	·93875	·93082	·93056	·93045	·93018	·92361	·92313	·93101	·92427	·92405
40	·94655	·03901	·93875	·93865	·93838	·93217	·93168	·93923	·93275	·93253

CHEMICAL CONSTITUENTS OF PLANTS.

Herr M. Ballo contributes an important paper on this subject to the 'Proceedings of the German Chemical Society.' He thinks that oxalic acid has a much more important function in vegetable physiology than is generally supposed, carbohydrates being formed from the reduction of this and other vegetable acids rather than by direct synthesis from carbonic acid and water. Tartaric acid, on the other hand, is a product either of the oxidation of carbohydrates or of the reduction of oxalic acid, as is also the glycolic acid which occurs in unripe grapes and in the leaves of the wild vine. As regards all other products of oxidation, the less the amount of oxidation the more complicated is the product and the more closely related to the original substance; while, when oxidation is carried on further, we get the original substances by which the plant is nourished. The vegetable acids are the most common products of oxidation in the plant. A portion of the oxalic acid is used in the decomposition of calcium sulphate, the rest as the raw material for the production of glycolic, tartaric, malic, and succinic acids.

If formic acid is heated with nitric acid, it is oxidized into carbonic acid and water, the nitric acid being reduced to nitrous oxide; but at the commencement of the process oxalic acid is formed, and the author believes that this process also takes place in nature, according to the equation—

$$2H_2CO_2 + O = H_2C_2O_4 + H_2O,$$

and that this is one of the reasons why nitrates are so valuable to the growing plant. In the living plant a portion of the nitrates is used in the production of ammonia and other substances nearly related to it, and another in the conversion of amide compounds into alcohol compounds. The greater part is reduced to the state of nitrous oxide, and from this nitric acid is again formed through the agency of oxygen and water. Hence a small quantity of nitrates can bring about the formation of a large quantity of oxalates.

Electric currents exist without doubt in the living plant, and it is possible that in some cases these may be converted into chemical work consisting in the decomposition not merely of water but also of salts. The products of decomposition of these salts may cause the formation of metal derivatives at the negative pole, of derivatives with negative radicals at the positive pole. Elsewhere, these substances may again combine with one another, and the same process be then again repeated. Hence the comparatively small quantity of inorganic salts found in plants.

The Pharmaceutical Journal.

SATURDAY, JULY 19, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelop s indorsed "Pharm. Journ."*

FOOD ADULTERATION AND FOOD ANALYSIS.

AMONG the numerous Conferences that are being held in connection with the International Health Exhibition hardly one will rank higher in interest to the readers of this Journal than that on the subject of food adulteration and analysis convened by the Institute of Chemistry at the commencement of the present week. On the one hand the practice of chemical methods and the use of the microscope involved in food analysis are so closely associated with the daily manipulations in a pharmaceutical laboratory that the training of the skilful pharmacist eminently fits him for expressing an opinion upon the subject of the genuineness of articles of food; on the other, no tradesman has greater reason than he to desire that legislation designed for the suppression of adulteration may be safeguarded, so as not to become an instrument of oppression through the perverse influence of an obstinate and wrong-headed public official. Naturally the discussion in this Conference turned principally upon the operation of the Sale of Food and Drugs Act passed in 1875, and it incidentally illustrated one of the weak points in the operation of that Act in the fact that during a considerable portion of the six hours over which the Conference extended a casual visitor straying into the meeting-room might have inferred that its provisions applied only to milk, or at the utmost to that and three or four other articles of food. Indeed, a multitude of words and no little mild sarcasm, were evolved in arguing whether it was possible that a natural secretion could fall below a standard of quality set up for it by a self-constituted areopagus, or whether analytical data, avowedly representing the results of distinct methods of operating, could differ from each other and yet be correct.

The Conference was appropriately opened with a paper by Dr. BELL, who, as principal of the Laboratory at Somerset House, is practically the arbitrator selected by the Legislature to advise magistrates or justices in cases of disputed analyses that come before them. An abstract of this paper, as well as of the subsequent discussion, will be found in another part of this Journal. In the paper reference was made to several articles of food that were hardly mentioned again in the discussion; a few statistics were quoted which, standing alone and unqualified, were capable of conveying to the minds of the hearers a very erroneous impression; and certain opinions were expressed with respect to the carrying out of the Act which will commend themselves to the careful consideration of all interested in the subject as coming from a competent and impartial critic. With respect to the articles of food it is curious to note that milk, which afterwards furnished the principal topic for discussion, and the Somerset House decisions concerning which have caused more irritation among public analysts than any others, was the subject of only a passing remark in the paper. This may have been due to the disinclination of Dr. BELL to throw down the glove on such an occasion. But the question was soon raised by Dr. DUPRÉ and Mr. WIGNER, who challenged the basis upon which they assumed the conclusions of the Inland Revenue chemists had been arrived at; whilst Mr. HEHNER seems to have been disposed to impugn the conclusions themselves as being erroneous interpretations of results, due to insufficient experience. The subject having been broached, however, it soon became evident that silence was not to be attributed to a sense of weakness, for the communication from Mr. BANNISTER and the pungent speech of Mr. HELM, at least made it evident that there are two sides to this as to so many other questions. Indeed the case became almost a *reductio ad absurdum* when a report of analyses by Dr. VOELCKER was quoted which appeared to show that some groups of cows, exhibited by dairymen upon the supposition that they were exceptionally superior animals, had yielded milk of a quality not corresponding to the standard fixed by the Society of Public Analysts in containing 9 per cent. of solids not fat, and were, therefore, according to the President of that Society, fit only to be sent to the "knackers." A previous President of the same Society, Dr. MUTER, however, virtually abandoned this hard and fast line, and expressed an opinion that a milk yielding a lower percentage of solids not fat might be passed as genuine, provided that the fat was correspondingly high, and this opinion was endorsed by Dr. REDWOOD, Dr. BELL and other speakers. Dr. BELL, too, whose temperate statement of the principles by which he and his colleagues had been guided in their decisions should remove some of the acerbity that has been imported into this discussion, alluded to the fact that natural products of all kinds vary greatly both in composition and in quality, and that difficulties must attend the assumption that lowness in quality should necessarily be held to indicate sophistication; he also deprecated, as an economic blunder, the fixing of limits of quality which would tend to discourage the production or diminish the supply of any article of food. So much for the setting up of arbitary standards for natural products! Concerning the statistics quoted by Dr. BELL, it may be remarked that the very slight variation in the percentages reported to have been found adulterated

out of the total articles examined during three years does not necessarily preclude that there has been a diminution of adulteration, the fact probably being that the figures in the successive years are not fairly comparable with each other. As pointed out by Dr. REDWOOD, the field worked by the inspectors has much narrowed since the earlier days of the Act; gradually it has become evident that certain articles are sent into the market free from adulteration, so these have one by one been dropped out of the scope of operations, and official purchases are now nearly confined to a few articles that have proved to be specially liable to sophistication. It must be remembered also that in the majority of cases inspectors devote special attention to probable offenders and their wares. Dr. ATTFIELD was, therefore, quite justified in disputing that a return of 15 per cent. of adulterated articles amongst those submitted to examination necessarily implied that 15 per cent. of the articles of food and drink supplied to the public are tampered with. In fact, as we have alleged on previous occasions, the value of the statistics returned under the provisions of the Act to the Local Government Board is very much vitiated by the partial and irregular manner in which the law is put in force in different parts of the country. Not only does the wilful inertia in some cases of the local authorities prove an effectual disturbing element, but we hear now that in other cases early zeal has become tempered by discretion resulting from the lenient decisions of too benevolent magistrates. On the whole, however, Dr. BELL considers that the existing legislation has proved to be efficient for the suppression of adulteration, and that it only requires to be worked more vigorously to be productive of still greater good to the community. Still, the question arises whether the community really cares very much about the subject, and the extremely limited extent to which the public avails itself of the provision of the Act for the analysis of private purchases is certainly suggestive that it does not. Some will be inclined to add to this that the Act has certainly sharpened the wits of certain classes of traders, and furnished them with indications as to what they may and what they may not safely sell to their customers.

In view of the sensational statements that have sometimes been put forward when there has been no immediate fear of contradiction it is perhaps surprising that so little was said during the Conference about drugs and medicines. It is true that one speaker somewhat satirically referred to the presence of chalk in scammony, and spoke rather loosely of a practice of mixing sulphate of lime with sulphur; but this was ostensibly for the purpose of explaining that public analysts were acting within the lines of their duty if in their certificates they mentioned the presence of such ingredients when they found them. This, however, is not a proposition that is disputed; what is objected to is the undue importation of personal opinion so as to become a source of hardship to the dealer. The danger of this sometimes occurring is illustrated by the statement made by Dr. ATTFIELD that in nineteen out of twenty cases—presumably of chemists and druggists—defended by a trade association under his advice, the defence had been successful, and notwithstanding Mr. ANGELL appears disposed to scoff at the production of various pharmacopœias in Court during some of these proceedings, it will be obvious that such a course may be useful in helping to complete the education even of a public analyst. The complaint raised by Dr. STEVENSON does not apply to the ordinary retail supply of medicines, to which, indeed, he referred only in terms of commendation. But we may express an opinion that if the managers of public institutions continue to accept contracts for the supply of medicines, wilfully oblivious, either through ignorance or indifference, of the fact that the contract prices would not represent the first cost of the articles, if of proper quality, they must not expect to be held blameless for any untoward consequences that may follow.

The Government appears still to have some hope of passing the Medical Acts Amendment Bill this Session. On Tuesday, in the House of Commons, in reply to a question put by Mr. Gray, whether considering that notice had been given of a large number of amendments, upon which there was likely to be prolonged discussion, it was intended to proceed with the Bill, and if so whether the day could be named upon which it would be taken, Mr. Gladstone said it would be made the second order of the day on Monday next. In consequence of this decision it is desirable that pharmacists who are in a position to influence any members of Parliament should communicate with them, urging them to attend in their places on Monday and support the amendment of which notice has been given by Mr. Sclater-Booth. From the Report on another page we learn also that the Council of the Pharmaceutical Society of Ireland at its last monthly meeting resolved to petition the House of Commons in favour of the amendment and to ask Irish members of Parliament to support the petition.

* * *

In the recently issued annual report on the public gardens and plantations of Jamaica, Mr. Morris mentions an interesting experiment made upon a plantation of *Cinchona succirubra* trees. It had been intended to harvest a full crop of bark from these trees, but it was decided instead only to "shave" them, in order to determine which method of collecting the bark would be the most profitable. The total number of trees "shaved" was 2144, which yielded 5218 lbs. of wet bark, or an average of 2·34 lbs. of bark per tree, the average weight of bark brought in each day per man being 50¼ lbs. Twelve months subsequently it was found that not a single tree had suffered from the treatment to which, the plantation had been subjected; on the contrary, the renewal of the bark had gone on in a most uniform manner, and the trees were then in a condition to yield another crop equal, if not superior, to the previous one.

Mr. Morris also reports that the demand for "Jamaica quassia," the wood of *Picræna excelsa*, has greatly increased lately, "owing, it is said, to its utilization as a substitute for hops." The exports of this wood from Jamaica last year amounted to 1815 tons, of the value of £3631. Another plant which has also come into prominence as a hop substitute is the Jamaica "bitter bush" (*Eupatorium villosum*), which is common in many waste places in the island. It is said to have an agreeable aroma and contain a bitter principle which has long been recognized by the natives.

* * *

The *Moniteur de la Pharmacie* states that one of the principal articles of commerce in the district of Hanoi is oil of star anise, which is manufactured on the frontier of Lang-Son. The industry is carried on by Chinese, who extract the oil by submitting the seeds to uninterrupted boiling during thirty-six hours.

* * *

A notice has been issued stating that the thirty-second annual meeting of the American Pharmaceutical Association will be commenced in the city of Milwaukee, Wisconsin, on Tuesday, the 26th of August, at 3 o'clock p.m.

* * *

Considerable soreness still seems to remain in some quarters with respect to the errata in the first issue of the new edition of the Codex. The "Errata" have been published as a separate sheet, for which a charge of twenty-five centimes is made, and against this an indignant protest is raised by a writer in *L'Union Phamaceutique*.

* * *

The same writer points out as a *chose assez curieuse*, that the Codex Commission is one of the few commissions that receive honoraria, and says that in connection with the new edition, a sum amounting to no less than thirty thousand francs has been distributed. This, he argues, amounts to a surcharge of three francs per copy, so that if the Commission had been replaced by some good pharmacists, who would have been glad to have given their services gratuitously, the cost of the work might have been considerably reduced.

* * *

The Druggists' Circular states that the United States Army department has this year contracted for eight thousand ounces of bisulphate of quinine, while up to the present time it has bought none of the ordinary sulphate. This course is attributed not only to the ready solubility of the bisulphate, which enables it to be dispensed in aqueous mixtures, but to "the well ascertained fact that this ready solubility renders its action more prompt and certain." It is further stated that the bisulphate is also coming into favour outside the army. Both salts are official in the United States Pharmacopœia.

* * *

In Austria there is an effort being made just now to carry out a resolution passed by the Austrian Pharmaceutical Society at its last meeting, in the establishment of a "home" for pharmacists. In this institution it is proposed to receive, either free of cost or upon payment of a moderate amount sufficient to cover the bare expenses, pharmacists to whom, through age or misfortune, a comfortable home may be welcome, as well as others desiring a quiet resting place during convalescence from illness.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting was held on Wednesday, July 2, 1884. Mr. James E. Brunker, M.A., President, in the chair.

Present:—Professor Tichborne, Dr. R. Montgomery and Messrs. Allen, Doran, J. Evans, Grindley, Hayes, Hodgson (Treasurer), Simpson and Wells.

The minutes of the previous meeting were read and adopted.

A letter was read from Mr. Nicholas R. Lowe (whose attendance at practical chemistry had been short), asking the Council to reconsider the decision of Committee, and allow him to supplement his attendance on practical chemistry in another school, before the October examination.

It was decided to inform Mr. Lowe, that he would have to put in his course and conform with the regulations.

The Report of the Certificate Committee was then handed in, and on the proposition of Professor Tichborne, seconded by Mr. Hayes, was unanimously adopted.

Mr. W. N. Allen stated that in view of the fact that a gentleman who had received instruction in practical chemistry under Dr. Frankland, in the Department of Science and Art, South Kensington, had offered to present such a certificate, and that the Society did not acknowledge such schools, he had prepared a motion in this matter. There was really no reason why such certificates should not be accepted. Several gentlemen would probably present themselves with similar certificates. He would, therefore, beg to move:—

> "That the Government School of Science (Department of Science and Art), South Kensington, be one of the schools, the certificates of which for *Practical Chemistry* are accepted by this Society."

Professor Tichborne, assuming that the course in question would come within the requirements of the rules of the Society, seconded the motion, which was unanimously adopted. This resolution to be sent to the Privy Council for confirmation.

Professor Tichborne moved:—

> "That, having regard to the notice given by Mr. Mundella, to the House of Commons, upon the extension of the Poisons Bill to Ireland, this Council should communicate with the Chief Secretary, reminding him of the suggestions already forwarded by them on this subject."

He thought that this might appear more or less a matter of form, but he was of opinion that it would be very desirable. He need not remind them that they had passed some resolutions concerning amendments, which it would be desirable to have introduced into the Poisons Bill; but if he did not mistake, they were somewhat mixed up with other matters, and it would be well therefore, to make a division. Mr. Mundella had announced in the House of Commons that it was intended to proceed at once with the Poisons Bill for Great Britain, and the question whether that Poisons Bill should have force in Ireland would be left to the consideration of the Lord Lieutenant. Now, the views of the Society had been placed before the Chief Secretary for Ireland, and as Chief Secretary for Ireland he was more or less an officer immediately under the Lord Lieutenant, and he (Professor Tichborne) presumed that the question must come before the Chief Secretary. However, he thought that it would be desirable to draw the Secretary's attention to the fact that they had submitted an opinion to him on this question, and were anxious to have the Bill extended to Ireland, and it would also be desirable to submit afresh to him

an expression of such views. Their former communication might have been pigeon-holed under a different official heading. This was a vital question in which all felt interested.

Mr. Hayes seconded the motion, which was adopted unanimously, and the Registrar was instructed to take the necessary action.

The President stated that he had received a letter from the President of the Pharmaceutical Society of Great Britain, in which reference was made to the fact that the Medical Acts Amendment Bill was now before the House of Commons, and that they were desirous that every effort should be made by individuals and societies of the great pharmaceutical body to alter the existing state of the law and give pharmacists a share in the compilation of the national Pharmacopœia. With this view it was desirable that petitions embodying such a wish on the part of pharmacists should be forwarded to the House of Commons. The Pharmaceutical Society had therefore prepared the following amendment to the Medical Acts Amendment Bill to be inserted after clause 63 of the Bill:—

> "For the purpose of compiling such Pharmacopœia there shall be established a Pharmacopœia Committee, consisting of six medical practitioners to be nominated by the Medical Council, and five pharmaceutical chemists, four to be nominated by the Council of the Pharmaceutical Society of Great Britain (one of the four to be resident in Scotland) and one by the Council of the Pharmaceutical Society of Ireland."

This amendment he (the President) thought was quite in accordance with the views of the Society. It was an anomaly that England should be the only country that shuts out its pharmacists from taking a responsible part in the preparation of the Pharmacopœia. In every other country, as they were aware, the pharmacists had a large voice in the preparation of it. They were in many ways better adapted than others to suggest and criticise preparations and processes. He would therefore propose—

> "That a petition be prepared and presented to the House of Commons (similar to that sent last year to the House of Lords), praying for such an amendment in the Medical Acts Amendment Bill now before the House as will admit the pharmacists of the United Kingdom to a share in the work of compiling the national Pharmacopœia, and that the Irish members of Parliament be asked to support that petition."

If adopted he would entrust the amendment to Mr. Gibson. In his (the President's) opinion it could not be in better hands. It would be well also to issue a circular on the matter to the other Irish members. They (the Society) had already sent copies of the recommendations of the Society to the Chief Secretary and to the Irish members.

Mr. Wells seconded the resolution, which was carried unanimously.

Mr. Peter Finlayson Baikie, of 68, Grafton Street, was proposed for membership by the President, seconded by Mr. Hayes, and unanimously elected.

The following gentlemen were proposed for membership:—Messrs. John Laird, Limerick; W. J. Baxter, Coleraine; and W. A. Frizell, Londonderry.

Several accounts were then presented and passed.

The proceedings then terminated.

On the same day, and during the two following days, the examination for licence as pharmaceutical chemist was held. Thirteen gentlemen presented themselves for examination.

Provincial Transactions.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The last meeting of the session was held in the Materia Medica Museum (Owens College), on Thursday evening, June 19. Mr. A. H. Jackson, B.Sc., President, in the chair.

There was a good attendance.

The minutes of the last meeting having been read and confirmed, Mr. J. Brooks Thornley read a paper on—

The Manufacture of Sulphuric Acid.

The author, after a few preliminary remarks, spoke of the various disputes which had arisen regarding the discoverer of this acid, and after noting the earliest method by which it was procured (by distilling green vitriol), passed on to the manufacture of the Nordhausen acid, describing its properties and uses. The next process noticed was that in which potassium nitrate and sulphur were burnt in iron pans, suspended in large glass vessels containing a little water; and afterwards that of Dr. Roebuck, of Birmingham, who constructed the first leaden chamber in this country in 1746, and, with a few modifications, introduced the process now in use. The author then described the works of Messrs. Realy and Radcliffe, of Manchester, where, in 1799, they had six leaden chambers, each of which was 12 feet long, 10 high, and 10 broad, which consumed 1386 lbs. of sulphur, and 198 lbs. of potassium nitrate weekly to produce 1800 lbs. of acid, costing about £21 10*s.* per ton to make, and sold for £60. The manufacture of the English acid was next alluded to as consisting in passing nitric acid fumes, sulphur dioxide, air and steam into large leaden chambers. The nitric acid is produced by heating sodium nitrate and sulphuric acid in an iron pan, which is heated from the sulphur furnace. The sulphur dioxide, obtained by burning sulphur or more commonly iron pyrites, is passed up a leaden tower, called the denitrating tower, filled within about 2 feet of the top with bricks and flints, meeting on the way two streams of acid, one from the Lussac tower (where it has absorbed all the nitrous gases which escape from the chambers), and the other from the chambers of weak acid. The latter assists in liberating the nitrous gases held by the stronger acid, and they pass upwards to be used again, while the acid is considerably concentrated on reaching the bottom. The reactions which are supposed to take place in the chamber, as studied by Désormés and others, were then treated of; and after that the concentration of the acid, comparing the relative advantages of evaporating by means of glass retorts and platinum stills; next the various precautions which have to be observed throughout the process; and the purification and tests which are applied. A few notes on the properties, uses and value of the various kinds of acids brought the paper to a close, when the author desired especially to thank Mr. W. Elborne (Vice-President) for his kind assistance in procuring him access to various works of reference, and Messrs. W. and G. Hart for the trouble they took in showing him the various processes on the occasion of his private visit to the sulphuric acid works of Messrs. Tennants and Co.

A discussion followed, in which the President, Messrs. Griffiths, Elborne, Breeze, Kirkby, Mitchell, and the Secretary took part.

The President then announced that the Committee had decided that the conditions for the competition of Mr. Hart's annual prize of one guinea were as follow:—"(1) That the prize be open to all members of this Association who have not passed the Major examination of the Pharmaceutical Society. (2) That the award be made to the author of the best paper read before the

Association during the coming session, greatest weight being given to originality of matter."

The first meeting of the next session will be held on Thursday, October 16, when an address will be delivered by the President, Mr. A. H. Jackson, B.Sc.

On Saturday afternoon, June 21, at the invitation of Messrs. Tennants and Co., a numerous party of the members of the Association and their friends visited the chemical and sulphuric acid works of the above firm at Ardwick Bridge. Attention was first drawn to the operation of making sulphuric acid, the production of the SO_2 from Sicilian sulphur, the formation of the nitrous gases from nitrate of soda and sulphuric acid placed on trays and heated in the sulphur furnace, the sampling of the weak acid, and all the practical details necessary to the successful carrying on of the process being well explained by Mr. G. Hart (manager to Messrs. Tennants and Co.). The final concentration of the acid in glass retorts having been witnessed in full operation, practical demonstrations were given on the manufacture of Epsom salts from kieserite, of Glauber's salts from the bye-products of other operations, and on the distillation on the large scale of nitric and hydrochloric acids.

A hearty vote of thanks (proposed by Mr. Hart and seconded by Mr. W. Elborne) to Messrs. Tennants and their manager terminated a most enjoyable afternoon's excursion.

Proceedings of Scientific Societies.

INTERNATIONAL HEALTH EXHIBITION.

Conference on Food Adulteration and Analysis.

A two days Conference, convened by the Institute of Chemistry, on Food Adulteration and Analysis, commenced its sittings on Monday, under the presidency of Dr. Odling, F.R.S.

After a few introductory remarks by the Chairman, the introductory paper of which the following is an abstract, was read by—

Dr. James Bell, F.R.S., who, after after a rapid sketch of the history of adulteration and the legislative measures adopted to deal with it up to the passing of the Food and Drugs Act of 1875, proceeded to discuss the results obtained by that measure, and the many suggestions for its improvement. In regard to the first question he said the number of samples examined in England and Wales in 1880 was 17,673, and the percentage found adulterated 15·7. In 1881 the number was 17,823, and the percentage found adulterated 14·6; and in 1882 the number examined was 19,439, and the percentage adulterated 15·0, so that the percentage of adulteration had been found to be practically stationary. It must be borne in mind that the samples were nearly all purchased by inspectors, many of whom were personally known to the tradesmen, and the object of the purchases well understood, while some districts throughout the country were inadequately, if at all, represented.

The small number of samples submitted for analysis by private purchasers had been more than once commented upon by the Local Government Board, and showed that the expense of the analysis, together with the trouble involved in the event of a prosecution, were more than private individuals were willing to bear. The working classes especially, who formed the bulk of the population, and were the greatest sufferers from adulteration, could hardly be expected to take action on their own account, if only by reason of the expense; and there existed also the further impediment of the analyst residing many miles away, and his name and address not being generally known.

It was also much to be regretted that an evident unwillingness had been found on the part of some local authorities to bring the Adulteration Act into operation, while in other districts the local authorities had been much discouraged by the small fines imposed by the magistrates, even when the offence had been committed more than once. There could be little inducement for them to carry out the Acts energetically when they found that, after going to all the expense and trouble of the purchase and analysis of samples, and taking the necessary legal proceedings against a fraudulent tradesman, the heinousness of his offence was assessed by the magistrates at such a trifling sum as could be readily covered by the illegitimate profits of a few days.

With regard to the analytical difficulties in the detection of adulteration, he agreed that when the adulterant differed chemically or microscopically from the article to which it was added, as when alum was added to flour or bread, or wheat flour to mustard, the detection of the adulterant was only dependent on the skill and experience of the analyst. But when it was similar in character, or identical with one of the constituents of the articles to which it was added, they were met at the outset with a formidable obstacle in the fact that natural products of all kinds varied greatly both in composition and quality, and the problem presented for solution was, therefore, whether the lowness of quality was due to natural purity or to adulteration.

Some butters, for instance, were so rich in quality that they would admit of a large addition of foreign fat and still yield analytical results within the limits of genuine but poor butter, and the pure milk of some cows was of so low a quality as not to be equal to that from other cows after being largely watered. There were teas which, regarded from whatever test of quality they might apply, were so rich that they would bear a considerable admixture of partially exhausted tea leaves, and still yield results equal to those from poorer yet genuine teas. This was the difficulty which more than all others of a scientific nature stood—and he feared it would continue to stand—in the way of the entire suppression of adulteration. It had frequently been urged that certain "limits" founded upon the analysis of samples of average quality should be laid down and legalized for natural products, below which such articles should be deemed to be adulterated, but in the opinion of many practical men it would be unwise to adopt any legislative measure with respect to limits of quality which would tend to discourage production and diminish the supply of any article of food.

It would be an economic blunder if, for instance, in raising the quality of milk by half of one per cent. on the solids contained in it, we decreased the actual production in quantity by ten per cent. At present it might be said that about 6300 samples of milk were annually analysed in England, of which 20 per cent. were returned as adulterated. The offences were practically confined to the addition of water and abstraction of cream. Taking the country as a whole, the total number of samples analysed appeared to be insufficient to show to what extent adulteration was generally practised, or to act as an effective bar to the practice.

In connection with the subject of butter he might mention that the manufacture of artificial butter compounds from animal fat had in recent years attained enormous proportions in the United States, and that these compounds, known as butterine, oleomargarine, suine, were, in the opinion of high authorities, legitimate articles of commerce if sold under names which properly indicated their origin and composition. If manufactured in a cleanly manner from sound fats they were perfectly wholesome, and afforded the poor a cheap and useful substitute for butter, especially during the winter months, when good butter was both scarce and dear. The Legislature of the State of New York had, however, resolved to suppress the manufacture after an inquiry, said to have been very one-sided, and in which it was stated that such

compounds contained deadly germs, that the workmen engaged in their manufacture were subject to loathsome diseases, and that by their use the death-rate had increased to an alarming extent. Putting aside exaggerated statements, it was highly probable that with the increased demand there might have been less care exercised in the manufacture than at first, and in some cases impure or decomposed fats might have been used, but these, he thought, were grounds rather for sanitary supervision than for the suppression of the trade. The successful manufacture of this factitious butter had naturally suggested its substitution for milk fat in cheese, but there was no evidence that "butterine cheese" had yet found its way into the English market. When it did, there were adequate chemical tests to distinguish it from the genuine article.

Coming to the question of spirituous liquors, about two thousand samples were annually analysed, of which 25 per cent. were reported to be adulterated, but only in very isolated cases had any other adulterant than water been found. This was a striking refutation of the opinion so frequently expressed that most of the evils of spirit drinking were due to adulteration. On several occasions samples of whisky had been sent to him from districts where the people were said to have been injuriously affected by drinking the spirit, but he had never met with an adulterated sample, although the spirit was invariably of a raw and immature character. The changes that took place in the maturing of spirit, by which it lost its fiery character and the deleterious traces of fusel oil became changed into comparatively harmless flavouring ethers, were not well understood, and it was impossible by any mode of analysis then known to separate spirits into the two clearly defined classes of those which were new and deleterious and those which were sufficiently matured to be harmless. The difficulty was increased by the common practice of blending spirits of various ages and flavours in order to obtain a mixture having a certain recognized character. An unsuccessful attempt had been made to meet this difficulty by a legislative provision that no spirit should be allowed to go into consumption until it had been at least a year in warehouse. Even if the measure had become law the difficulties in regard to brandy would not have been lessened, because its production is carried on outside this country, and the practice of adding a certain proportion of plain spirit and sugar flavouring had become fully recognized. A popular notion had long prevailed that no article was more manipulated than beer, and it was therefore satisfactory to find that there had been comparatively few prosecutions for the adulteration of beer, and that so far as he knew the only adulterant found had been common salt. As salt was added as an antiseptic, and really increased the keeping properties of some beers, it had been contended that the public could not have been much prejudiced in those cases where the quantity added was not more than sufficient to bring the total to that found in genuine beers of high repute.

He might say that in most articles of food there had been a very great improvement in recent years, and that the gross and deleterious forms of adulteration which were stated to have been extensively practised at one time were now practically extinct. Thus the only substances now found in cocoa were sugar and starch, and in the manufacture of confectionery, the use of earthy substances had not only been discontinued, but pernicious colouring materials had been replaced by harmless vegetable colours almost entirely throughout the trade. Even in pickles and preserved vegetables it was rare to find the colour heightened by the addition of a salt of copper, and cayenne was no longer improved in colour by the use of red lead.

The conclusion he derived from all this was that the machinery provided by the Legislature for the suppression of adulteration was fairly efficient, and only required to be vigorously worked by the various local authorities in order to be productive of great good to the community. He trusted the Conference would be the means of stimulating those authorities to a more zealous administration, and directing their attention to the advisability of obtaining samples for analysis from every part of their district, and with such precautions as would ensure the purchase of articles in the state in which they were ordinarily supplied to the general public.

The Chairman said it was very gratifying to find that there had been so great an improvement in recent years with respect to adulteration, and that the grosser and more unhealthy forms of it were now practically abandoned. He then mentioned a variety of points in connection with the subject, which might usefully be discussed, for example, whether the Act required amendment, and how it could be amended without interfering unduly with trade and the progress of invention; how its operation could be made universal, and the number of samples examined greater; how far the inspectors could be sure of obtaining samples corresponding with those supplied to the public; whether there should be a limit placed on the discretion of the magistrates in reducing fines for repeated offences; whether the Act should be made more stringent in the case of such articles as beer, which sometimes contained neither malt nor hops, or less stringent with relation to substitutes for butter; how far the presence of chemical agents should be allowed for preservative purposes, such as boracic acid in milk; whether the Act should be extended to food for cattle; whether the present mode of settling differences of opinion by reference to Somerset House was satisfactory; whether standards or limits should be laid down in the case of articles of variable quality, like milk, and how far such a system would affect the general supply; and lastly, there was the question whether the addition of certain articles should be permitted which, as in case of alum to inferior flour, had the effect of improving the appearance of the article, and might not have any prejudicial effect on health.

Dr. Voelcker thought it was very desirable to include cattle foods in the Act, for they were very generally adulterated, particularly feeding cakes, and often produced very prejudicial effects on cattle. It might be advisable to fix a standard or limit for milk, but it must be done carefully. The present standard of fat adopted by public analysts was in his opinion too low, and he believed more than half the milk sold in London was partially skimmed, especially in the strawberry and garden party season. On the other hand, the standard of solids not fat in milk was too high, and had been fixed on the basis of an imperfectly dried residue. One danger of fixing a standard was that the trade would regulate their milk by it, and he thought it would be much better to have it sold in the natural state. He could not agree with Dr. Bell that no cheese made partly from butterine had yet found its way into the English market, and large quantities of oleomargarine were constantly exported to Holland and came back as Dutch butter. He saw no objection to wholesome substitutes for butter being sold, provided they were properly described. There was no doubt that adulteration had been greatly diminished, owing to the labours of public analysts; but he would venture to caution them not to jump too readily to conclusions. He had known of one case in which cream was condemned for containing starch, which on investigation he found was only due to its having been strained through a new linen cloth, the starch granules being very few, and in another case he found a slight purple colour in cream was due to the milk having been strained through a red cloth which had been dyed with aniline. Of course he did not say this was a right thing to do, but he could not say that the milk was adulterated.

Dr. Dupré said he gladly availed himself of an opportunity which rarely occurred of placing before the public the analysts' view of these questions, and he hoped there

were manufacturers and dealers present who would also express their opinions. No doubt adulteration had greatly diminished, but still the Act had not been nearly so effective as it should have been, mainly owing to the apathy of the general public. The primary object of the Act was to protect the public, but the public did not seem to appreciate it, and gave the analysts hardly any support. The result was that the analysts found themselves opposed on all hands, and every obstacle was put in their way, and their position was often entirely misunderstood. The sole function of the analyst was to examine the articles brought to him, and, if called upon, to give evidence in Court, but he had nothing whatever to do with instituting prosecutions; he occupied in fact a perfectly neutral position. Another reason why the Act was less effective than it might be was the ridiculously low fines inflicted. If a man were fined 5*s.* for selling adulterated milk, he could recoup himself by the sale of 12 quarts of water under the name of milk, and as the same man was never visited repeatedly, which would be called persecution, the fine was totally inoperative. On one occasion he found that though the proportion of adulteration in milk had been reduced to 1 in 6, on examining samples collected on a Sunday morning six out of seven were adulterated, on the next Sunday every sample was genuine. With regard to the limit below which milk was considered adulterated, though occasionally a single cow might be found to give milk below that standard, it was never the case with a whole dairy, and on this question he could not help thinking that the authorities at Somerset House had made a mistake. The Act did not use the word adulterated, but said the article must be of the nature, quality and substance demanded, and it would be well if it kept to that throughout and did not require impossibilities from the analyst; but, unfortunately, it contained in the schedule a form of certificate which had to be exactly followed, and that required him to state that such and such a foreign ingredient was present in a certain quantity. Now in many cases it was impossible to do this, and therefore many articles were passed which were known to be adulterated. In the case of red wines, for example, it was often impossible to tell what colouring matter had been added, though the analyst might be quite sure the wine was not genuine. He thought the addition of articles like boracic acid to milk should not be allowed, and considered it rather fortunate that milk turned so easily, as it made cleanliness imperative on dealers. He had noticed that whenever milk was suspiciously low in cream it generally had a trace of boracic acid in it. With regard to spirit, there was no evidence that young spirit contained more fusel oil than old, and some samples of Cape whisky and Chinese spirit which had been shown to be very injurious, when examined were found to contain less fusel oil than ordinary whisky.

Mr. Wigner (President of the Society of Public Analysts) thought Dr. Bell had taken rather too favourable a view of the action of the Act up to the present; and it certainly had not done as much good as it ought. It was almost a disgrace to find the percentage of adulteration still so high as from 17 to 19, and he did not think the statistics quoted from Mr. Herbert were quite accurate. The percentage of adulteration of milk since 1879 had increased by nearly 3 per cent., and in groceries, had only very slightly decreased. He was in favour of a standard for variable articles like milk, and thought there was just as much reason for excluding from sale the milk from an unhealthy or badly fed cow, which naturally fell below the standard, as if it were artificially watered. Such cows ought to be sent to the knackers, not kept as milk machines. In America, there were Adulteration Acts in force in most of the States, and in the great majority there were standards in use such as were recommended by the Society of Public Analysts. In Paris there was a much more stringent Act in force than the English one, and there the same standard was adopted. About 10,000 samples were taken every year, while in London, there were only 1200 or 1400. The result was that the adulteration of milk was only 2 to 3 per cent., while in London 17 per cent. were adulterated by skimming, and 17 per cent. by the addition of water. He was in favour of a limit being fixed, but higher than that adopted by Dr. Bell, which he thought had been fixed on the basis of poor cows being legitimate milk producers, which he did not agree with. The section which provided for the examination of tea in bond had been an entire success, and the adulteration of one or two other articles had been entirely suppressed, but more powers were required. The Local Government Board could insist on analysts being appointed, but had no power to compel the appointment of inspectors or the purchase of samples, and consequently the Act was a dead letter wherever the local authorities chose to make it so. In many cases where the authorities at Somerset House could not confirm the results of the public analyst, he believed Dr. Bell would agree with him that they were equally unable to say that he was wrong, and in such cases, he thought the conviction ought to stand. He did not think the fixing of a standard for milk would have any appreciable effect on the supply, and if it did, it could easily be made up from that which was now used for condensing purposes, as condensed milk could readily be imported.

Dr. Attfield, F.R.S., said he should not like it to go forth to the world that 17 per cent. of the articles of food sold were adulterated, which he did not believe to be the case; the truth was that from 15 to 17 per cent. of the samples examined by public analysts were said to be adulterated, which was not quite the same thing. As the result of twenty-five years' experience in analysing articles of food and drink, and especially drugs, he did not believe that one in one thousand was adulterated. For the last ten or twelve years he had been chemical adviser to a body of traders, who were liable to be charged with adulteration, and out of some twenty-five cases of prosecution, he had advised that twenty should be defended, in nineteen out of which the defence had be successful; in several cases he had not had to give evidence at all, the case having been upset in consequence of a few questions put to the witnesses for the prosecution. If the same rule held good in all other cases, the inference would be that a similar proportion of the other cases would have failed if they had been contested, but he did not desire to draw such an inference; he simply questioned the wisdom of drawing any inference from the figures annually put forth. He protested against articles being publicly and officially branded as adulterated before they had been proved in a court of law to be adulterated.

Mr. Hehner vigorously contested the position taken up by Professor Attfield, which would lead to the conclusion that an immense amount of injustice had been inflicted on innocent tradesmen. The aim of those who had to carry out this Act was, not to obtain a fair average, but to do the greatest amount of good for the least possible expenditure, and, therefore, the inspectors only purchased samples which they thought likely to be adulterated. If Dr. Attfield were so fortunate as to only find one case of adulteration in a thousand, others would naturally get a larger percentage. All analysts must have noticed a great decrease in the extent of adulteration; for instance, it was formerly very common to find milk which had had from 25 to 50 per cent. of water added, but now it was rare to find a sample which had as much as 20 per cent.; 10 or 12 was much nearer the mark. The more deadly adulterants again, such as vermilion and chromate of lead, were not found now; as had been said, it was only cheating, not poisoning, which took place, and this certainly was a public benefit. It was a great pity that the Act was not made universally compulsory; there might be a town in which it was not enforced, though it was in all the surrounding dis-

trict, and there the milkman could put his can under the nearest tap, directly he crossed the borough boundary, with impunity. He knew of several boroughs in which the Act was not enforced at all, or very negligently, owing to the influence of tradesmen on the town council. With regard to cases referred to Somerset House, which were about twenty-five or thirty a year, in only about one-half were the analyst's conclusions not confirmed, and even in those cases it was often, not a difference as to the actual results, but as to the conclusions to be drawn from them. Of course, they were all liable to mistakes, but he believed the mistakes made were very few; the principal cases of dispute were with reference to milk, on which the Court of Appeal had really much less experience than the public analysts, who analysed about 6000 cases every year, whilst at Somerset House probably not more than 600 examinations had taken place altogether.

Professor de Chaumont quite agreed with what had been mentioned by several speakers with regard to the loose statements which were made in regard to the presence of adulterants in articles of commerce. One important point to consider was, whether they should deal with articles as avowedly prepared articles of commerce, as was understood to be done in the case of beer, or whether they should deal with them as articles that ought to be provided in a pure state. As a great number of articles were allowed to be used in the manufacture of beer, it was hardly possible to lay down any possible standard of what beer ought to contain, but this did not apply to butter and cheese. At a Milk Conference at Gloucester, one gentleman suggested that milk should be taken as an article of commerce at a particular standard; and this gentleman considered it very hard that if he had some cows yielding a particularly rich quality of milk, that he should not be allowed to take the cream off and sell the milk, which would then be equal to the usual standard. The Adulteration Act might be amended in this way, that no mixtures whatsoever with articles which could be provided as pure articles, ought to be allowed at all. If coffee was sold under the name of coffee, it ought to be pure coffee, and if people desired to use chicory, by all means let them buy it and mix it themselves. He thought the Adulteration Act was above the standard of morality of the present day; in fact it was too respectable an Act for general outward application. Many a tradesman who would scruple to put his hand into one's pocket and take out 6*d.* or 1*s.* did not hesitate to put water into his milk, or chicory into his coffee. If a man was fined for adulterating milk one day, and then brought up again a day or two afterwards for the same offence, it was looked upon as persecution; but supposing a man was punished for picking pockets, and he immediately resorted to the same practice, it would not be considered persecution if the police again took him into custody. Until they reached the point at which they could make it felt generally that adulteration was a distinct wrong against society, there was not much chance of getting the Act carried out to its full extent.

Dr. Muter asserted that the passing of the Adulteration Act had done great good, for in 1870 of twenty-three samples of sweets which were then examined, thirteen were coloured by a coating of chromate of lead and three contained streaks of vermilion as well, and out of forty-seven samples of coffee bought as pure in that year, thirty-one were more or less mixed with chicory, whilst in seventeen cases the chicory itself was mixed with something else; but now there were none of these tainted sweets sold. In 1872, in the South London Laboratory, they examined over ten thousand samples of food, out of which number they had to take one thousand certificates into Court, all of which, with one exception, they had been able to support. In those districts in which the inspection was complete, there was a less amount of adulteration, for in one district where they took at least four hundred samples, the percentage of adulteration had been reduced from 25 to 6½ in another district where only three hundred samples were taken the percentage of adulteration had been reduced from 25 to 12, and in another district where they only took perhaps twenty or thirty samples annually, they found every one of them bad. He could not say what was the state of things existing in Newington, for the Act had never been put in force there at all. The Local Government Board could make it compulsory on a local board to appoint an analyst, but unless an inspector were appointed the analyst would have nothing to examine; and it ought to be made compulsory that the number of samples purchased every year should bear some reasonable ratio to the number of dealers in the district. With regard to fixing a limit a Commission should be appointed, consisting of one eminent chemist appointed by the Government, another appointed by the public analysts, and a third to represent the Chamber of Trade. This Commission should examine in turn every commercial article of food, and should fix a limit, below which the standard of that food should not sink, and this standard should then be confirmed by an Order in Council. This had already been adopted in New Zealand. With regard to milk he thought the standard should be so fixed that if the fat were over a certain limit it would not matter if the solids not fat were rather low; but if the fat were below a certain limit, plainly showing that skimming had taken place, then the non-fatty solids ought to be calculated on a higher standard, because taking away the fat from the milk by skimming increased the proportion of solids not fat. He then referred to a prosecution for the adulteration of scammony with chalk, when Professor Attfield said in evidence that the chalk ought not to be taken any notice of, as the scammony root grew in a chalky soil, and that the gum was obtained by making little incisions in the root and by putting in little shells in which it collected, and he said what was more natural than for the innocent natives to put a little chalk on the shell to keep the scammony from sticking to it. The result of this evidence was that the analyst was laughed out of Court and the prosecution failed. In another case the public analyst had found that a sample of milk of sulphur contained so much sulphate of lime. When the case came into Court it was proved that it was quite a common thing to put sulphate of lime with sulphur, and that for some complaints it was far better, and that in point of fact it was quite a legal thing to sell. Instances of this kind did not show that the analyst was wrong in his analysis, he had simply to do his duty and say what the samples submitted to him contained, and not whether they were the better for being mixed with the adulterant or not.

A communication was then read from Mr. Bannister, of the Chemical Department, Somerset House, in which he said the method of obtaining the amount of solids not fat laid down by the public analysts was to dry the solids not fat for three hours only, and not continue to dry till the weight was constant. In the Somerset House laboratory the "solids not fat" and "fat" were dried till the weight was constant, and from experience they found that 8·5 per cent. solids when obtained in their way was equal to 9 per cent. as determined by the method followed by the public analyst.

In a letter from Dr. Wallace, of Glasgow, he said that if a standard were fixed it should not be too low, say 8·5 and 2·5 solids not fat or 8·75 and 2·75, and when a sample came below that the milkman should have an opportunity of proving his innocence by having his cow or cows milked in the presence of the inspector or analyst. In any future Act it should be made compulsory for all towns and local authorities to appoint both analysts and inspectors.

Mr. Barham thought it would be better if analysts occasionally asked the assistance of the leaders of the various trades in carrying the Adulteration Act into effect. While he had no desire to be personal he must

take exception to a public analyst writing sensational articles in the papers with reference to milk which had been purchased by their own officials and then writing a letter to one dairy firm saying that their milk was perfectly pure. He wondered the Society of Public Analysts had not more professional pride than to allow such things to be done. A great deal of unmerited praise had been bestowed on the Paris supply of milk; he had had some experience of the supply of milk to Paris, and he considered that London had the finest supply of any town in the world. The analyst went into Court and swore that such and such a sample of milk contained a certain percentage of added water; but he had not found the added water, he had only inferred it. If a standard for milk were fixed it ought to be put low enough to cover the poorer samples, and then people would have to depend on the repute of the firm with which they dealt. There had been a short Act passed enacting that milk should be sampled at the railway station, but he did not believe that this was enforced in more than three parishes in London. With regard to clause 14 of the Act, instead of its being optional to the inspector to divide the sample it should be made compulsory.

Dr. Stevenson said he must protest against the adoption of such a standard as was proposed by Dr. Voelcker. He then referred to the very small number of samples that were received from the public, and said that the public analysts were desirous of having more assistance from the general public. As a rule public institutions, such as hospitals, infirmaries, etc., were supplied with the worst drugs, and it was said that this was because the manufacturers contracted to supply the articles for a sum for which genuine articles could not be supplied. With regard to the use of alum in bread-making, he was of opinion that if a certain kind of flour required that alum should be mixed with it to make a presentable loaf, this should be allowed, but that the purchaser should be informed of it.

Mr. Easton, a dairyman, said he knew of a case where a man was summoned for an addition of 4 per cent. of water; he got the case adjourned and a sample sent to the chemists at Somerset House, who came to a righteous decision, and the case was dismissed. It had been said that the adulteration of milk had dropped from 50 per cent. to 6 per cent., and as the Act had only been in operation since 1872, it was quite possible that in time the occupation of the public analyst would be gone.

Mr. Helm (Somerset House) referred to some analyses made by Dr. Voelcker, who found that out of twenty-three short-horn cows thirteen gave a milk below the society's standard, whilst out of nineteen Jerseys three gave milk below that standard; out of sixteen Guernseys four gave milk below, and out of six Dutch four were below the standard. At Somerset House they sent round the whole of the country, and out of two hundred and thirty-eight single cows the milk of one hundred and eighty-four would have been pronounced adulterated according to the society's standard, as yielding below 9 per cent. of solids not fat, and out of twenty-four dairies eleven fell below the standard. The question was what could be done to make the Act more effective? Unfortunately it was not efficiently worked throughout the country. Theoretically, the machinery provided was effective, but it was not carried out. He did not see the benefit of making the appointment of an inspector compulsory if he were allowed to go and purchase samples in a policeman's uniform.

Mr. Angell said it frequently happened that he had a number of samples of beer sent to him to examine, and in consequence of the fact that there was no formula laid down for the composition of that beverage, he was bound, unless he found something absolutely injurious to health, to certify that the beer was genuine. He would suggest that under the name of ale anything might be sold in the shape of bitter and wholesome beverage made from what source it might, but if a man asked for beer he should have malt and hops only supplied to him.

Professor Redwood almost entirely agreed with what had been said by Dr. Muter. On the subject of the examination of milk he thought the reason that a great many articles were not found now to be adulterated was because the inspectors when they first commenced their work, finding that these articles were practically never adulterated, had now confined themselves to a limited number of articles such as were most liable to adulteration, as, for instance, milk, butter, coffee, mustard, etc. In one of the metropolitan districts with which he was connected there had been a very large improvement, whereas in others the case was quite different, those being districts where the inspectors only now and then purchased samples for analysis, the result of which was that the traders got into the irregular habit of supplying adulterated articles. He certainly considered the substance sold to the public under the name of cocoa was well understood, unless there were some special explanations given, to be cocoa mixed with starch and sugar, but, nevertheless, if he found a sample with an undue proportion of those additions he should look upon it as adulterated. The same with reference to mustard: no doubt the addition of a little flour improved it for dietetic purposes, but he should look upon the addition of more than 8 per cent. or 10 per cent. as an adulteration. Of course mustard intended for medical purposes should be absolutely pure.

Mr. Cheshire (public analyst, Hastings) said in his district the inspector only procured samples when he had reason to suspect they would be adulterated, and yet they only found about 15 per cent. were adulterated. One reason why small fines were often imposed was that they did not always fall on the really guilty party, and the plea was often made in the Hastings Court that they sold the goods as they bought them. With regard to what had been said about giving quantities in the certificate, he was in favour of keeping things as they were. With regard to the use of chemical reagents in beer, if a reagent were at all likely to be injurious he should certify against it directly. With regard to testing milk he adopted the usual plan of drying for three hours, and in every case if it fell below 9 he had certified against it, and he had never had an appeal to Somerset House, which appeared to him to show that the milkmen admitted the adulteration.

Mr. Lloyd said one difficulty in the way of working the Act arose from the fact that a fee of 10*s.* was required for the analysis of privately purchased samples, because no one could be expected to buy a shillingsworth of food and pay 10*s.* in order to prove whether it was pure.

Mr. Leit said the variations in the natural composition and the alterations caused by the tendency of the fat in milk to separate in the form of cream made it difficult to ensure the supply to the general public of an article in no way tampered with, and at the same time not to do wrong to the honest dealer.

Dr. Bell, in reply, said he did not oppose the fixing of standards or limits, but it was for the public analysts and the trade to decide upon, not for him at all—his duty was simply to do justice between the two parties. He did not say they were prepared to pronounce milk containing 8·6 or 8·7 of solids not fat not adulterated if they found evidence sufficient to satisfy their minds from other data connected with the analysis that it was adulterated; but if they had not sufficient evidence from the data obtained they could not conscientiously pronounce it adulterated, and they gave the defendant the benefit of the doubt.

A vote of thanks to the Chairman concluded the Conference.

BRITISH PHARMACEUTICAL CONFERENCE.

Meeting of the Executive Committee.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, July 16, 1884.

Present:—J. Williams, F.I.C., F.C.S., President, in

the chair; Mr. Atkins, Professor Attfield, Messrs. Bell, Carteighe, Ekin, Hills, Naylor, Southall and Taylor, Dr. Thresh, and Messrs. Benger and Plowman (Hon. Gen. Secs.).

Letters of apology for non-attendance were read from Professor Bentley, and Messrs. Payne, Radley, Stephenson and Young.

Mr. Plowman (Hon. Gen. Sec.) reported that since the last meeting of the Executive Committee he had again visited Hastings and had conferred with the local officers concerning the details of the arrangements for the forthcoming meeting at Hastings.

Mr. Bell (Chairman of the Hastings Committee) said that the local arrangements for this meeting were practically complete, that the instructions of the Executive Committee, especially with regard to the expenses, would be carried out to the letter and that he anticipated a very successful meeting. He was very pleased to announce the fact that, as a result of the intended visit of the Conference to Hastings, a Chemists and Druggists' Association had been formed there. He also said Sir Thomas Brassey had shown great interest in the proceedings of the Conference and would probably attend the meeting.

It was resolved that the usual grant of books from the Bell and Hills Fund be made to the newly formed Hastings Association, and that a copy of Bentley's 'Botany' be forwarded to the York Chemists' Association, to complete the set of books granted in 1881.

Mr. Benger (Hon. Gen. Sec.) reported correspondence with Aberdeen, respecting the meeting in 1885, and read a letter from Mr. Strachan, conveying a cordial invitation to the Conference to meet in that city, during the visit of the British Association. It was understood that a delegate would attend the Hastings meeting to renew this invitation, and further consideration of the subject was deferred.

Mr. Plowman reported that a very large amount of correspondence had passed between the General Secretaries and the recently appointed Colonial Secretaries, and that, as a result, he had sent out three thousand circulars to the latter for distribution in their respective colonies. These circulars included an invitation to membership, a statement of the objects of the Conference, a condensed list of subjects suggesting for research, and a coloured lithograph with a specimen page of the Year-Book. Sufficient time had not yet elapsed for full replies from the more distant colonies to reach England, but, already Mr. Ross had nominated for membership a number of pharmacists resident in the West Indies, and Mr. Shillinglaw had reported that he would in all probability be able to forward by next mail the names of between forty and fifty candidates for membership. Mr. Evans also had sent some new names from Canada, and hoped shortly to be able to make considerable addition to the number. Mr. Miller had sent a fine specimen of native bread (*Mylitta Australis*) weighing 37 lbs., and a communication on this would be made at the general meeting. Mr. Miller hoped to be able to see all the pharmacists in Tasmania, and to use his personal influence to induce them to join the Conference.

The Honorary General Secretaries regretted that the name of Mr. A. P. Miller, of Hobart, had been omitted from the published list of Colonial Secretaries. He had been duly appointed for Tasmania, but by some unfortunate oversight, his name had been omitted.

A discussion took place on the conditions under which grants in aid of research are made. The opinion was generally expressed that, in accordance with the existing rules, a report of work done or in progress must in all cases be presented at each general meeting.

A Publication Committee for 1883-4 was appointed.

It was decided that early in every year an invitation to membership should be sent to all gentlemen whose names had been added to the Register of Chemists and Druggists during the preceding year.

Mr. Ekin intimated that at the coming meeting it was his intention to resign his position as Treasurer, and Mr. Benger also intimated that he was desirous of relinquishing the position which he had held for thirteen years of Honorary General Secretary. Much regret was generally expressed at the prospect of losing the valuable services of these two officers.

The names of a number of gentlemen to act as officers for 1884-5, were brought forward, with a view to recommend them for election at the general meeting. The further consideration of this business was deferred till the next meeting of the Executive Committee.

The Honorary General Secretaries stated that reports on subjects for which the Conference had made money grants would be presented at the Hastings meeting by Messrs. Elborne, Gerrard, Dunstan and Short, and Dunstan and Ransom.

The following gentlemen had promised to contribute papers:—Messrs. D. B. Dott, T. Greenish, J. Hodgkin, G. A. Keyworth, T. Maben and Deckan, W. A. H. Naylor, L. Siebold, Balmanno Squire, J. Williams, R. Wright and Dr. Quinlan. The following gentlemen would probably read papers:—Messrs. J. M. Broad, C. Ekin, E. M. Holmes, P. MacEwan, G. F. Schacht and A. E. Tanner.

Letters of thanks for the 1883 Year-Book of Pharmacy were read from the Pharmaceutical Society of Great Britain (London); the North British Branch of the Pharmaceutical Society (Edinburgh); the Royal Society of London; the Yorkshire College of Science; and Associations of Chemists and Druggists at Arbroath, Glasgow, Hull, Manchester, Oldham, Sheffield and York.

It was decided that copies of the Year-Book should be presented annually to the Associations of pharmacists at Hastings and Hawick.

The thanks of the Committee were accorded to the Pharmaceutical Society of Ireland for a copy of the 1884 Calendar, and to the Pharmaceutical Society of Victoria for copies of the Pharmaceutical Register and Annual Report of the Pharmacy Board.

ROYAL INSTITUTION OF GREAT BRITAIN.

The Physiological Aspect of Mesmerism.*

BY J. N. LANGLEY, M.A., F.R.S.

Scattered about in the literature of the seventeenth and eighteenth centuries are many records of the cure of divers human maladies in simple and mysterious-seeming ways.

Valentin Greaterakes, in Charles II.'s reign, was, we are told, "famous for curing various diseases and distempers by a stroak of the hand only." His power, he thought, was a special gift from heaven. Many people, however, were not slow to say that he had dealings with the devil. In some cases wonders were wrought by touching the affected parts of the patient with a magnet. Maxwell, who in 1679 published a short treatise on magnetic medicine, attributed the cures brought about by this, and by some other unusual forms of medical practice, to the accumulation of a subtile fluid in the body of the patient. This subtile fluid was diffused through all things in nature; a fortunate few amongst men had an inborn power of controlling its distribution. Such men could cure all diseases; they could indeed, he says, by adding to their own proper quantum of fluid, make themselves live for ever, were not the influence of the stars adverse.

In 1775 the theory of animal magnetism was put forward in Vienna by Friedrich Anton Mesmer. Neither his theories nor his facts differ very greatly from those of some of his predecessors. There exists, he says, in nature a universal fluid; in virtue of this, the human body possesses "properties analogous to those of a magnet; there

* Read at the Weekly Evening Meeting, March 14, 1884.

are to be distinguished in it poles equally different and opposite, which may even be communicated, changed, destroyed, and restored; even the phenomenon of inclination is observed therein." By means of this magnetic fluid all the maladies of man could be healed. A few years later Mesmer left Vienna for Paris. At first he magnetized his patients by gazing steadily at them, or by means of "passes;" but as patients became more numerous, he brought them into a proper magnetic condition by other methods, often of a very fantastic nature. The patients did not, when magnetized, all show the same symptoms; some passed into a heavy sleep, some became insensible to touch, or even to stimuli ordinarily painful; some became cataleptic, some were seized with local or general convulsions. This last condition was called a crisis, and was the triumph of the mesmerizer, the moment when the disease was considered to be forcibly expelled from the system. Nowadays it is the last state a physician would care to produce in a patient.

For a time Mesmer's success was enormous. His admirers subscribed for him a sum of nearly 350,000 francs, receiving in return details as to the method of magnetization. In Paris the belief in the power of Mesmer to cure diseases soon waned; but by this time he had made a stir in the world, and had drawn attention to a number of facts which were either only locally known, or largely disregarded.

Mesmer devoted himself chiefly to curing patients, and it must be added, to receiving fees; but about ten years after the time of his coming to Paris it was found that a state resembling somnambulism, or sleep-walking, could be produced in some persons by magnetizing them. This gave a stimulus to the investigation of what I may call the magical side of the phenomena. This magical side had always been present, but in the height of Mesmer's power had not been much regarded. Of the magic of animal magnetism I will say one word more presently.

The term animal magnetism lingered long, but has now happily fallen into disuse, either mesmerism or hypnotism being used in its stead. "Hypnotism" we owe to Dr. Braid, of Manchester, who, from 1841 to the time of his death in 1860, subjected all the phenomena said to be produced in the magnetic state to a searching investigation. Braid is the founder of mesmerism in its scientific aspect. Hypnotism and mesmerism, as commonly used now, are synonymous terms; it would be advantageous, I think, if we could make a distinction between them. We might, for example, use the term hypnotism to embrace all those phenomena which are proven, and the term mesmerism to embrace all those phenomena which are not proven. Mesmerism would then mean what I have called its magical side and would embrace those phenomena which are sometimes called the *higher* phenomena of mesmerism. These are of various kinds. It is said, for instance, that one person can, at any time he wishes, mesmerize another who is at a distance, and who is in perfect ignorance of the intentions of the mesmerizer; that a mesmerized person can conceive the thoughts and sensations of the mesmerizer, without receiving any indications from the known organs of sense; that a clairvoyant can see with parts of the body other than the eyes, for example with the back of the head, or with the pit of the stomach; that a clairvoyant can describe places and persons which he has never read of, or heard of, or seen. Those observers who have done most to elucidate the subject, such as Braid, have failed to observe any of these and other similar higher phenomena. They are unproven. It would be convenient, I say, to include such phenomena only, under the heading of mesmerism; but this I cannot yet venture to do. The facts I have to mention I shall call those of hypnotism or mesmerism indifferently. The magical side of the subject may, I think, at present be fairly left out of account.

Primarily, the hypnotic or mesmeric state is one in which the will is partially or wholly paralysed by certain sensory impressions; but there is no distinct line of demarcation between this and various other conditions, such as occur in sleep, somnambulism, and in some diseases of the central nervous system, such as hysteria. In each there is a typical state, but between them are many transition states.

Before discussing the mesmeric condition, I must say one or two words about the action of the central nervous system. I trust you will forgive me if, as very well may be the case, you find that part of what I say seems too simple to need saying, and part too complex and uncertain to be said without reservation. The one for the sake of clearness must needs be stated; the other for the sake of brevity must needs be dogmatic.

Here is a diagram of the brain and of the spinal cord of the frog. In this, all the chief structures of the brain of man are represented. For my present purpose it is only necessary to distinguish three divisions.

First there is the spinal cord. If a frog be decapitated, the brain is of course removed and the spinal cord is the only part of the central nervous system left. Yet if any part of the body of the brainless frog be gently stimulated, a particular movement results—a reflex action is produced. If, for instance, the right hind leg is gently pinched, this leg and this only is kicked out; if the left fore leg is gently pinched, this and this only is moved. Diagrammatically we may represent any one of these movements as being brought about in the following way. Pinching the skin stimulates the nerve endings of a sensory nerve, so that a nerve impulse—analogous to, but not identical with, an electric current passing along a wire—travels up the nerve to a sensory nerve cell in the spinal cord. In this nerve cell certain changes take place which result in an impulse being sent along another nerve to a motor nerve cell in the spinal cord. This is, in consequence, stimulated to activity and sends out a third impulse along a motor nerve to a muscle. The muscle then contracts, and the limb is moved.

If the brainless frog be pinched somewhat sharply, the movements which result are more extensive than when it is gently pinched, a spasm of the whole body may result. Referring to the diagram, we may represent this in the following way. The sensory cell, being more strongly affected, sends out impulses to a number of other sensory cells on the opposite side of the spinal cord, and above and below it; these send impulses to their motor centres, and thus a more or less widely-spread movement results. This spreading out of impulses from the part immediately affected is called the irradiation of exciting impulses. When any part of the skin is stimulated, many sensory and many motor cells are affected; a collection of cells serving a common purpose is called a nerve centre. The spinal cord, then, consists of a collection of nerve centres. By appropriate stimulation, any one, or all of these nerve centres can be set in activity.

The second division of the central nervous system is the posterior part of the brain—the brain minus the cortex of the cerebral hemispheres. This, like the spinal cord, consists of a collection of nerve centres, but the function of these nerve centres is much more complex than that of the centres of the spinal cord. A stimulus to the skin, which, when the spinal cord is the only part of the central nervous system left, will produce either a local movement or no movement at all, will, when the posterior part of the brain is also present, produce a general co-ordinated movement such as occurs in walking, jumping, swimming. In fact, all the co-ordinated movements of which the body is capable can be brought about by the activity of one or more of the lower centres of the brain. Moreover, these centres can be set in action by events which have no effect when the spinal cord only is present. Here a flash of light or a sudden noise sets in activity a nerve centre in a manner strictly comparable to the way in which a pinch applied to the foot sets in

activity a nerve centre in the spinal cord; and just as in the spinal cord the active sensory centre may excite to activity a motor centre, and this may cause the foot to be moved, so in the lower centres of the brain the activity of the visual or auditory centre may excite to activity a motor centre and lead to a complicated movement, such as shrinking or jumping. A frog with these two divisions only of the central nervous system does nothing of itself; it is without will and consciousness, in the same way that the frog with a spinal cord only is without will and consciousness; it is a complicated machine, any part of which can be put in action by using the proper means.

The last division of the central nervous system is the *cortex* of the cerebral hemispheres. This part of the brain is concerned with ideas, with will, and with consciousness in the sense in which that term is usually employed, that is, speaking generally, it is concerned with the higher psychical functions.* In saying that this part of the brain is *concerned* with the higher psychical functions, I mean that every higher psychical act is accompanied by some definite change in the cortex of the cerebral hemisphere. I mean that every emotion, every idea, every effort of will is accompanied by an activity of nerve cells in this part of the brain, and that this activity is comparable to the activity which takes place in definite cells of the spinal cord when a leg or arm of a brainless frog is pinched.

Here we touch the much disputed question of the localization of the functions of the brain. Roughly speaking, this question is whether there are nerve centres in the cortex corresponding to those which exist in the rest of the brain and in the spinal cord:—whether, for example, visual sensation and ideas are accompanied by an activity of one part of the cortex, and auditory sensation and ideas are accompanied by an activity of a different part of the cortex; or whether visual and auditory sensation and ideas may occur in any part of the cortex, the mode of activity of the cells being different in the two cases.

Happily, it is not necessary to enter into this question in order to gain a fair idea of the chief features of mesmerism. The idea which we gain lacks no doubt definiteness in detail, and we must be prepared to express it in different language according as we find later, that the cortex of the cerebral hemispheres consists of one nerve centre with many functions, or of many nerve centres with different functions, or again as we find—and this is most probable—that the truth is between these two extreme theories.

But whilst we may put in the background the question of localization of function for the cortex of the brain, we must linger a little to consider its mode of action. I will take a particular instance.

The changes which occur in the retina of the eye when rays of light from an external object fall upon it give rise to nervous impulses which eventually produce in the cortex of the brain a certain activity; this activity leads to our forming an idea of the object. Now, in some cases the formation of the idea is all that takes place: often, however, impulses are sent out from the active cells of the cortex to a motor centre in the lower part of the brain, and a movement is made. This is a reflex action from the cerebral cortex. Here the active sensory centre excites a motor centre, just as happens in the spinal cord of a frog the leg of which is pinched. Our actions are often of this nature, though in many cases of course it is very difficult to say how far the will is exercised in the action. If you give a child a sweetmeat the child sometimes no doubt deliberates what to do with it; in others the rapid transference of the sweatmeat to the mouth seems to be simply a reflex action entirely independent of any effort of will, though accompanied by consciousness.

Dr. Carpenter has introduced the useful term unconscious cerebration into physiological psychology. By this is meant that the cortex may be active without our knowing anything about it. An instance which Dr. Carpenter gives, is that of trying to remember a name which for the moment we have forgotten, in such cases it is often best to give up consciously thinking, but the fundamental activities in the brain which accompany thinking go on nevertheless, so that presently without further conscious effort the name is remembered, is, as it were, thrown up into consciousness.

I said a moment ago that reflex actions not infrequently occur in which a conscious idea forms part of the reflex chain. But consciousness is not necessary to the reflex action; that is, the changes in the cortex which are the physical basis of the idea may be carried out without giving rise to consciousness. Here we want a term to imply that state in which everything necessary for an idea is present except consciousness. Sometimes this is called an "unconscious idea," which would be convenient enough but that "idea" is generally taken to imply consciousness. It is an act of unconscious cerebration.

Reflex actions in which an unconscious cerebration forms part of the chain occur to all of us. Some time ago, whilst walking up and down the laboratory at Cambridge, thinking intently on the result of an experiment, I noticed that the pipe which I had been smoking had gone out. Making up my mind to light it again, I walked to the place where the matches were kept, which happened to be close to a water-tap. As I went I began thinking again of my experiment. In a moment or two I was disturbed by a rush of cold water over my hand. I found that I had turned the water-tap, and let the stream of water run full into the bowl of my pipe. This was a reflex action from the cerebral cortex. The sight of the tap had given rise to what for this once I will call an unconscious idea, which had led to the somewhat complex movements of turning the tap and collecting the water in the pipe-bowl.

The central nervous system consists, then, of a vast number of nerve centres, each of which can be set in activity by an appropriate nerve impulse reaching it either by a peripheral nerve or from some other nerve centre. The action of these nerve centres is normally controlled by the will.

Here, at last, we come to mesmerism. The primary point in mesmerism is the paralysis of the will; the nervous system is then out of the control of the subject, whether animal or man, and, by appropriate stimulation, any one or more of his nerve centres can be set in activity. I shall consider first the behaviour of the lower animals when mesmerized: in these the phenomena, as far as at present observed, are much simpler than they are in man. If a frog be turned over on its back, it at once regains its normal position; if, however, it be prevented from doing so, and its struggles are for a short time gently suppressed, it becomes hypnotized. Then, although it be left at liberty to regain its normal position, it will not attempt to do so. Apart from the movements it makes in breathing, it lies motionless. If it has been held for a short time only the hypnotic state does not last long, usually from one to five minutes or ten minutes; but, if the movements it makes, say at the end of one minute, or five minutes, and so on, are suppressed, it will not infrequently happen that the frog will then stay without further movement for a considerable time, sometimes even for many hours. During the first part of this time a slight pinch, a sudden flash of light, or a loud noise, will usually cause it to turn over and sit up in its normal manner. For a moment or two it looks a little dull and confused, but rapidly regains its normal activity. During the latter part of this time it responds less and less to external stimuli. Reflex actions are less readily obtained

* It is not possible within the limits of this lecture to give the reservations that would be necessary in a full discussion of the subject.

or may not be produced at all by stimuli ordinarily effective. Within certain limits, the longer the frog remains hypnotized the more marked becomes its general insensibility, the decrease in reaction being earliest distinct in the centres of special sense. When it is in this state it may be propped up against a support with its legs crossed under it, or placed so that it rests on its head, or placed on its side with its legs arranged in this or that fashion, without offering the least resistance. Strong stimuli, or certain apparently lesser ones, for example, a dash of water, cause it to recover its position slowly; it then usually sits for several minutes motionless, and only after some time regains its normal sensitiveness and activity. I show you here a frog in the early hypnotic state.

I have spoken of the frog as being hypnotized or mesmerized. Let us consider what is meant by this. I think it is obvious that the animal does not remain passive from any astuteness on its part; it is incredible that the frog, finding its efforts to escape ineffective, should make up its mind to remain quiet, and should, although at liberty to move, stay still for hours, becoming more and more determined as time goes on to take no notice of noises, of flashes of light, and of pinching of its skin. On the contrary, it is, I think, obvious that in some way its will has become paralysed. In order to attempt to explain how this is brought about, we must consider another aspect of reflex action, an aspect which is very little understood.

You remember that a brainless frog will, when its leg is gently pinched, kick out the leg; but if just previously some other part of the body has also been pinched, one of two opposite things may take place; the leg may be kicked out more quickly and vigorously, or it may not be kicked out at all. In both cases the nerve centre involved in producing the movement of the leg receives an additional impulse from another nerve centre, but in one case the additional impulse increases the activity of the nerve centre involved in the reflex action, in the other case it annuls this activity—there is, to use the physiological term, an *inhibition* of the "reflex" nerve centre.

To take another instance, a frog without its cerebral hemispheres, but with the rest of its nervous system, will croak when its sides are gently touched; but if at the moment of touching it, its leg be pinched, it moves or jumps, but does not croak. Here the motor centre which causes the movements of the muscles in croaking receives nervous impulses from two sensory centres; one of these being set in activity by touching the sides of the frog, the other from pinching its leg. The impulses from the former tend to make the motor centre active, and so produce a croak; but the exciting effect of these impulses is annulled by the impulses coming from the latter centre; in other words the nerve centre involved in croaking is inhibited. Inhibition by impulses proceeding from the cortex of the brain occurs every day of our lives. The "will" is perpetually being brought into play to inhibit some nerve centre or other. For example, you may be on the verge of yawning, when it suddenly occurs to you that it will be better not to do so; you suppress the yawn without moving a muscle. What happens is this. An inhibitory nerve impulse is sent from the cortex, and puts a stop to the indiscreet activity of a nerve centre elsewhere in the brain. Further, when the cortex is set in activity in a particular way by one impulse, another impulse reaching it may inhibit the first activity, or, in terms of the localization theory, one nerve centre in the cortex may send out inhibitory impulses to any other nerve centre of the cortex.

I need not further multiply instances of inhibition. I wish, however, to lay stress on this, that it is highly probable that impulses travelling from any peripheral nerve-ending to a nerve centre, or from any one nerve centre to any other, may, under certain circumstances, diminish or annul the functional activity of the nerve centre, that is, may inhibit it. And there is equal reason to believe that, under certain other circumstances, the effect produced will not be inhibition, but an increase of activity of the centre. The exact conditions which determine whether one effect or the other takes place, have not as yet been made out. For the present the facts must suffice us. We may now return to the mesmerized frog.

(*To be continued.*)

BOOK RECEIVED.

A Statistical Inquiry into the Nature and Treatment of Epilepsy. By A. Hughes Bennett, M.D. London: H. K. Lewis. 1884. From the Author.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Permanganate of Potash Pills with Paraffin, Vaseline and Kaolin as an Exicpient.

Sir,—I was much interested in Mr. George Smith's paper on the above on p. 21 of last week's *Pharmaceutical Journal*, but I have been unable to corroborate his results for three reasons:—(1) I had no permanganate of potash pills eighteen months old; (2) in making my permanganate of potash pills I have never used so much of the excipient as 3 grains to make 2 grains of the permanganate into a pill, thus making the pill weigh 5 grains *plus* the varnish; (3) the lack of details of his process does not show how he obtains his results. He does not say that he acidulates his solution of the permanganate obtained from the pills. I think if the following formula represents the decomposition (Watts's Dictionary, vol. v., 1029):—

$$Mn_2K_2O_8 + 3SH_2O_4 + 5C_2H_2O_4 = 2SMnO_4 + SK_2O_4 + 8H_2O + 10CO_2$$

it will require acidulating to get fairly quick results. In my hands this mode of testing was very slow, I, therefore, discarded it in favour of the B.P. process, testing with ferrous sulphate (granulated sulphate of iron of good quality) acidulated with diluted sulphuric acid. This yields much quicker results. I dissolved 44 grains of sulphate of iron in distilled water, adding 2 drachms of diluted sulphuric acid, and made up to 250 c.c. with distilled water. This quantity should decolorize and form a clear solution with 5 grains of permanganate of potash as per the following formula; the numbers work out as near theoretically correct as possible:—

$$K_2Mn_2O_8 + 10FeSO_4 + 8H_2SO_4 = 2MnSO_4 + 5Fe_23SO_4 + K_2SO_4 + 8H_2O.$$

Half a grain, therefore, of the permanganate should decolorise 25 c.c. of this solution; or if three 2 grain pills (= 6 grains of the permanganate) be as much as possible dissolved in distilled water, and the solution made up to 500 c.c., one-twelfth of this, or 41·6 c.c., should require 25 c.c. of the iron solution to decolorize it, supposing none of the permanganate has been reduced.

On applying this test to three ordinary 2 grain permanganate of potash pills, made by one of my assistants about two months ago (the oldest I have in stock), I found sixteen of them weighed exactly 40 grains, or an average of 2½ grains each, including the sandarach coating. I broke down the pills in a clean glass mortar without any difficulty, and used distilled water at the ordinary temperature of the pharmacy (about 75° Fahr. or 24° C.) in successive quantities to dissolve out the salt. This formed a transparent solution; it was filtered through glass-wool and made up to 500 c.c. The small quantity of the excipient, pale brown in colour, and most of the sandarach, mixed together and stuck to the sides of the mortar and pestle; in doing this no apparent reduction of the permanganate took place. Of the 500 c.c. of solution obtained I made three estimations of 41·6 c.c. of it (supposed to contain half a grain of the permanganate):—*a.* required 23 c.c., *b.* 23·4, and *c.* 23·2 of the ferrous sulphate solution to decolorize them, or an average of 23·2 c.c. out of a possible

25 c.c., showing that 92·8 per cent. of the quantity of permanganate of potash used in making them was present in the varnished pills. Further, I tried three 2 grain pills freshly made and varnished by myself, seven of which weighed 18 grains. Three estimations of a solution of these gave an average which showed 93·6 per cent. of unreduced permanganate still present in them. The powdered permanganate of potash salt of which the pills were made was tested and gave 101·6 per cent., showing a slight error in excess.

These experiments show that a reduction of the permanganate equal to 70 or even 50 per cent. in the quantity of permanganate used need not take place if the pills are carefully prepared and not kept too long. Still I do not think that keeping them, if well made, will injure them much; if so, the glossy varnished surface would have shown incipient change in some of those I have had in stock. But I do not want to keep them, at least not eighteen months.

I ought to add that since I first published the formula for the excipient, in January, 1883, the proportions of the ingredients have been altered, at the suggestion of Mr. W. S. Corder, a late assistant of mine. I now use equal parts of the three ingredients, vaseline, paraffin and kaolin (see 'Extra Pharmacopœia,' p. 167). This makes a better mass; still some dexterity is required in working it. "This is how it is done." The mortar in which the pills are to be made is well cleaned with oil of vitriol, rinsed out and dried; a quantity of the permanganate is then powdered in it: some adheres to it and the pestle. Afterwards an even quantity of the powdered permanganate is weighed to know how many pills it will make; this and some of the excipient are then well pounded together, and a trace of pure vaseline is added especially if the temperature be low (they are better made in a warm room). The mass being ready, it is divided out into suitable lots for making twenty or twenty-four pills, each of which should be well pounded before putting it on the machine to roll out. The pill-machine should be very clean and polished. The pills should then be rolled out in kaolin, or, but it is not so inert, French chalk. The fingers should be very clean; some of my assistants have kept a pair of light kid gloves to wear when making these pills, whether for the sake of the pills or their fingers I will not say.

I have often roughly tested the solubility in water of the permanganate of potash pills made as described, and have satisfied myself that the principal part of the permanganate remains in the pills as such,—that only a trace of it is reduced, not sufficient to be of any importance.

Other manganese compounds are said to be efficacious for the purpose for which the pills are required, but probably none present the manganese in such a form to be quickly and as completely assimilated as permanganate of potash does. In the stomach it no doubt is quickly reduced but readily combined again and absorbed as an albuminate. The pills are slowly soluble, and, therefore, do not cause nausea or have a corrosive action, such as the crystals might have if administered, as has been suggested, in the inside of a "Lamson" capsule.

Our chemical friends may criticize us, but they are not pharmaceutical experts, else they would know the public will not swallow 5 grain pills if the same quantity of drug can be put into 2½ grain pills. I enclose two samples of the pills I have referred to. I do not see any necessity to have them sugar-coated; if so treated it is probable a batch of them would go off by spontaneous combustion in a patient's pocket some day.

New Cavendish Street, W. WM. MARTINDALE.

Sir,—I would suggest that Mr. Smith in his further experiments in this subject should determine to what extent the alcohol of the sandarac coating solution reduces the permanganate, and if a solution of a resin in a hydrocarbon possesses the same reducing influence as an alcoholic solution.

Such determinations would be interesting, and probably of considerable importance.

Edinburgh. PETER MACEWAN.

THE SEED HAIR OF THE STRYCHNOS NUX-VOMICA.

Sir,—The very interesting paper of Messrs. Dunstan and Short in the *Pharmaceutical Journal* on "The Botany of the *Strychnos Nux-vomica*" forms a fitting pendant to the exhaustive researches by the same authors on the chemistry of this article of the materia medica, previously read at an Evening Meeting, and also published in the same Journal.

There is, however, one paragraph, referring specially to the seed-hairs, wherein it is stated that "their structure has often been described, but we are not aware that they have ever been sketched."

The woodcut referred to, Fig. 6, is from a drawing by Dr. Ondaatje, and to this drawing I take exception.

Berg* has carefully examined these seed-hairs and has beautifully delineated the same, together with several sections of the seed, and the drawing of the seed-hair has been reproduced by Flückiger.† From these drawings it will be seen that the special and typical characters of these hairs, the bulbous base of each, their graceful bend, and cleft-like markings on the bulb, from which the striated lines proceed to the points of the several hairs, are quite absent in Dr. Ondaatje's woodcut.

If this were merely a question of accuracy as regards an illustration of the hairs peculiar to any particular seed, it might have been passed over without further notice than just a record of the fact; but as nux vomica in a state of powder forms the base of some vermin-killers, accurate drawings of the hairs assume a vast importance.

Taking Dr. Ondaatje's woodcut as his guide it would be difficult for an expert with the microscope to distinguish in the contents of the stomach of a suicide or the victim of a poisoner between these hairs and many broken fibres, which, shredded from a worn material, are in an abnormal condition, and bear in their structure more resemblance to this drawing than this drawing does to the seed-hair.

The public analyst, equally with the forensic investigator, to make the microscope available in their search for organized vegetable structures, must have clear conceptions of the typical characters of the substance he is in search of, or the gravest errors involving reputation and even human life may be the unfortunate result.

A slide, showing the structure and form of the seed-hair, will shortly be placed in the cabinet of slides with the Library microscopes, for the satisfaction of anyone interested in this subject.

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D. Wharrie.—The Codex "Sirop de Goudron" (Syrupus cum Aquâ piceâ) is made by dissolving sugar in "eau de goudron" in the proportion of 180 grams of sugar to 100 grams of the water.

A. W. P.—"Brewer's yeast" consists mainly of the growth of a species of fungus known as *Torula cerevisiæ*. German yeast is made by freeing the yeast from water by draining and submitting it to pressure.

T. M. Deighton.—Information respecting the Lalande Battery may be obtained from Mr. H. A. Ferguson, 31, Lombard Street, E.C.

W. Johnston.—(1) We cannot say. (2) Probably *Teucrium Scorodonia*, judging from the taste. (3) *Galium palustre*. Plants to be named should be sent with flower and fruit.

J. Hutchinson.—(1) *Scirpus pauciflorus*. (2) *Carex pilulifera*. (3) *Carex ovalis*. (4) *Carex pulicaris*. (5) *Juncus compressus*. (6) *Glyceria fluitans*.

Pharmaceutical Chemist.—Cerastium triviale.

W. J. Reay.—Verbascum Thapsus.

N.—Quinine wine made according to the B.P. formula is allowed to be sold without a wine licence, but any variation from that formula brings it within the operation of the ordinary excise regulations relating to the sale of wines.

Anacardium occidentale.—"Tinct. Anacardii: 1 in 10 of rectified spirit. Dose 2 to 10 minims." (Martindale, 'Extra Pharmacopocia.')

J. M. Furness.—Thanks for the information, but the business is far outside the domain of pharmacy.

COMMUNICATIONS. LETTERS, etc., have been received from Messrs. Field and Co., Walton, Furness, Berside, Moeller.

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* 'Anatomischer Atlas zur Pharmazeutischen Waarenkunde.'

† 'Grundlagen der Pharmazeutischen Waarenkunde.'

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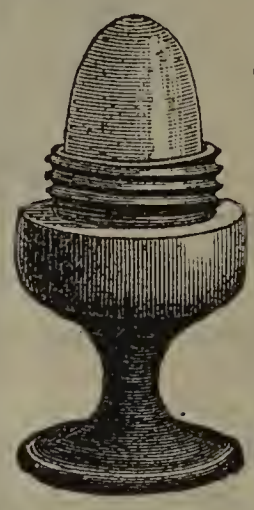

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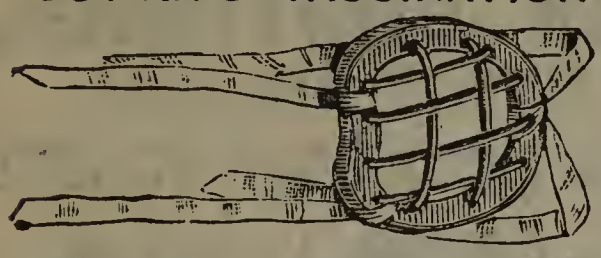

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EQUAL TO AND CHEAPER THAN VASELINE.

SANITARY FLUID AND SHEEP DIP,

THE CHEAPEST AND BEST DISINFECTANT.

Grease, Pitch, Asphalte, and all products of Tar and Rosin.

Samples and Prices on application.

GRINDLEY & CO. POPLAR, LONDON, E.

PURE SPIRITS OF WINE.

TO WHOLESALE DRUGGISTS, CHEMISTS, PERFUMERS, &c.

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Is used by all the principal Wholesale Druggists, Pharmaceutists and Perfumers in town and country (54° to 65°), and will bear testing with Ammonia. It is allowed to be the best article out for making Tinctures, Essences, and the most delicate Perfumes, being perfectly free from smell and Füsil Oil. Can be obtained through Druggists with E. B. and Sons' name and label on bottles, &c.

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Also at DUNNING'S ALLEY and 1, LAMB ALLEY.

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GOLD MEDAL, BOSTON EXHIBITION, 1883.

SIR JAMES MURRAY'S PURE FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of

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Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

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The CHOICE CHINESE SMALL TEA For Retail at 1/4.	72	per cent.
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The LONDON 2/6 TEA For Retail at 2/6.	55	,,
The LONDON ASSAM BROKEN TEA For Retail at 2/8.	16	,,
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The next complete course of lectures and classes will be commenced on September 2nd. Fees to the October examinations, 6 guineas; to December, 10 guineas; to February, 13 guineas; or the entire session, £21. Early entries by intending students are particularly requested, in order that benches may be secured and disappointment thus avoided.

Out of 5 Major candidates from this School 4 have passed at the Examination this month. Out of 10 Minor candidates who presented themselves last week 7 were successful.

For Prospectus apply to

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RAPID and thorough preparation, privately and in class. Postal Tuition for these Examinations and Beil Scholarship. For particulars, enclose stamp, Mr. A. DAWES, 1st B.A. Lond., Adderstone, Vardens Rd., New Wandsworth, S.W. (close to Clapham Junction Station.)

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A MONEY SAVING TEA. ABSOLUTELY PURE.
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Prospectus and samples free on application.
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The next Session will commence on Monday, September 1st.

Students intending to enter on the above date are requested to send in their names as early as possible, so that benches may be reserved for them.

FEES:—

To the October Examination	...	£5 5s.
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Six Months' Course ...	... ...	£10 10s.
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THE

Westminster College Prize Examinations

July, 1884.

SENIOR CHEMISTRY.	JUNIOR CHEMISTRY.
Silver Medal.	*Bronze Medal.*
Mr. T. THOMAS	Mr. A. TWIVEY
Bronze Medal.	*Certificates of Merit.*
Mr. C. O. MORRISON	Mr. W. BARKER
Certificates of Merit.	,, T. N. BROOKE
Mr. J. H. HOPPER	,, G. JACQUES
,, E. E. HALL	,, R. R. GANT

MATERIA MEDICA.	BOTANY.
Bronze Medal.	*Bronze Medal.*
Mr. W. H. GODSLAND	Mr. J. NEWTON
Certificates of Merit.	*Certificates of Merit.*
Mr. W. WORSLEY	Mr. J. T. LLOYD
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PRELIMINARY EXAM. NO PASS, NO PAY.

STUDENTS who really desire to be thoroughly and carefully prepared, so as to ENSURE SUCCESS, should study under the **NO PASS, NO PAY, POSTAL SYSTEM.** For particulars enclose stamped envelope to TUTOR, care of Mr. Filtness, Rotherfield. Reference to pupils who passed the last examination. Metric System Notes, 1s. The inflexions of each word in Cæsar, 1s.

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FOURTEENTH SESSION, 1883-4.

Entries now begun for the term commencing Sept. next.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

ENGAGEMENTS WANTED.

A MARRIED man, qualified, age 42, height 5ft. 9in., requires position of trust, very active, good Salesman and Prescriber, thoroughly acquainted with the mineral water trade, maker of soluble essences, and understands photography in all its branches. D. & Co., 99, High Holborn, London.

AS JUNIOR in a good Dispensing business in or near London. Good references. Height 5ft. 8in. 4 years' experience. H. PARRY, Meliora Villa, Freshfield, Liverpool.

LOCUM TENENS. Qualified. Age 29. Disengaged end of July. W. H. G., care of Wyleys & Co., Coventry.

LOCUM TENENS. Disengaged 2 days a week (Tuesday and Saturday). Steady and well experienced in good class Dispensing and Retail. Good references. F. F., 121, Camden St., N.W.

AS MANAGER, temporary or permanent, or in any position of trust. Town or country. Middle aged. Married. Disengaged end of the month. A. H., 2, Railway Ter., Wallington.

ABOUT the commencement of August.—As Junior ASSISTANT, in a good class business. Age 23. Please state particulars to A. B., Crosburn House, Long Bennington, Grantham.

WHOLESALE.—UNDERWAREHOUSEMAN or TRAVELLER. Advertiser, age 28, seeks situation as above. 6 years' experience in provincial Retail, and 5 years' London Wholesale. Highest references and good business capabilities. CHEMICUS, C. Steele, Esq., Ludgate Arcade, E.C.

AS JUNIOR. Age 21. With time for study. Near Wills' preferred. Can assist at Dentistry. G. S., 29, Penn St., St. Paul's, Bristol.

AS Temporary ASSISTANT. Disengaged until 1st September. Passed Minor, going in for Major. Good references. A. F. G., 5, Pitcairn Ter., Margate.

ENGAGEMENTS WANTED.

THE advertiser wishes to APPRENTICE his son, who has just left school. Age 16. Height 5ft. 6in. Premium not to exceed £40, payable by instalments. Address, giving full particulars, J. C. W., 95, Ashted, Birmingham.

AS ASSISTANT, for 2 or 3 weeks. Could Manage light Retail and Dispensing business. Tall. Age 21. Good references. Terms moderate. THETA, Mr. Pooley, Chemist, Wimbledon.

AS ASSISTANT or DISPENSER, in or near London. 10 years' experience. CHEMICUS, 58, Trinity Sq., Boro', London, S.E.

AS ASSISTANT. Minor qualification. Age 24. 9 years' experience. ARTHUR SQUIRE, 16, Western Rd., Hove, Brighton.

AS MANAGER or SENIOR in a good house, with ultimate view to partnership preferred. Age 30. Single. Qualified. Disengaged early in August. C. P., 55, Earl's Court Rd., Kensington, W.

LOCUM TENENS or ASSISTANT in emergency. By an Associate of long experience and good address. Moderate terms and excellent references. Disengaged. W. C. TAYLOR, 70, St. Stephen's Avenue, Shepherd's Bush.

AS JUNIOR. Age 22. Height 5ft. 8in. 6 years' experience. Good references. Disengaged, London preferred, J., 19, Norfolk Sq., Brighton.

AS ASSISTANT. Age 28. Major. First-class London experience. A. B., 22, London Rd., Neath, South Wales.

AS Temporary MANAGER. Age 30. Thorough experience. Disengaged from the 21st to 30th, and from August 9th. Abstainer. CHEMICUS, 2, Myrtle Cottages, Hoe St., Walthamstow, E.

AS ASSISTANT or MANAGER in good class business. Minor and Apothecaries' Hall qualifications. DELTA, 18, Lambeth Rd., S.E.

TEMPORARY or good permanency. Age 26. Height 5ft. 7in. Minor qualification. Good London, Paris and Provincial experience. Disengaged. A. J. NORTON, Linley House, Walter's Rd., Swansea.

BY a qualified Chemist, 33, married, no family, as MANAGER of Branch, or DISPENSER to Surgeon, Hospital or Dispensary. Attends ordinary Midwifery. 16 years' London and country experience. Disengaged. ALPHA, 404, Kennington Rd., S.E.

AS ASSISTANT. Age 20. Height 5ft. 11in. 4 years' experience. Now disengaged. In London preferred. Out-door. C. BROWN, W. Bingham, Chemist, Hainton Sq., Grimsby.

AS ASSISTANT, in good Dispensing business. Town preferred. Age 26. 11 years' experience. Abstainer. Please state hours of business and Sunday duty. STATIM, 162, Kennington Park Rd., S.E.

JUNIOR, well up in all branches. Disengaged. Age 24. B. H., 60A, Dalston Lane, E., Dalston Junction.

AS MANAGER or DISPENSER in a good house, by a qualified (Minor) ASSISTANT. Good experience. Age 26. London preferred. A. P. S., 137, High St., Croydon.

ASSISTANT. London preferred. Age 25. Used to first-class Dispensing. Locum Tenens not objected to. CHEMICUS, 41, South Side St., Plymouth.

AS JUNIOR. Ætat. 18. Height 5ft. 9in. 18 months' Homœopathic experience. Abstainer. Disengaged August 7th. Apply, stating hours, &c., to T. WILLEY, Mr. Darling, 126, Oxford St., Manchester.

AS JUNIOR in Retail, or DISPENSER to Surgeon. First-class experience. Age 21. Good references. CHEMIST, Llangadock, South Wales.

ASSISTANTS WANTED.

EARLY next month.—A competent ASSISTANT, with thorough references. A really efficient Junior would be treated with. Member of Christian church preferred. State particulars to H. H. POLLARD, Ryde, I.W.

AT once.—A young man, of good character, as DISPENSER and BOOKKEEPER to a firm of Surgeons in a country town. Salary £25 per annum and to live in the house. Apply by letter to Messrs. SELLS & RUSSELL, 109, High St., Guildford.

ASSISTANT, for a shop newly opened. Post Office in shop. Salary about £25 per annum. Apply to Dr. ANDERSON, Upton Park, E.

JUNIOR ASSISTANT. Must have been accustomed to Dispensing. Time for study, if required, in lieu of part salary. Apply, personally or by letter, stating usual particulars, to P. STACEY, Pharmaceutical Chemist, High St., Teddington.

FOR three months.—A competent ASSISTANT, not less than 23 years of age. A liberal salary will be given. Apply, J. STAINER, Folkestone.

MR. PHILLIPS, Pharmaceutical Chemist, Ealing, W., has a vacancy for a qualified gentlemanly ASSISTANT, age not less than 23, who has been accustomed to a good class Dispensing business. Application by letter, must be accompanied by carte de visite, which will be returned.

AN ASSISTANT, for light Retail and Dispensing, not under 22. Applicants to state usual particulars and enclose carte. J. BARNITT, 86, The Parade, Leamington.

BY a Surgeon on the South Coast.—A DISPENSER. Out-door. Apply, stating salary required, to D., care of Mackey, Mackey & Co., 1 & 2, Bouverie St., London, E.C.

JUNIOR or IMPROVER. Immediately. Age about 20 years. Apply, stating age, height, salary expected, references, with usual particulars, to Mr. YOUNG, Pharmaceutical Chemist, 73, West Ferry Rd., Millwall, London, E.

IMMEDIATELY. — Junior ASSISTANT. Out-door. Accustomed to general Retail and Dispensing business. Apply, stating usual particulars, terms and reference, enclosing carte (to be returned), to WM. SMITH & Co., Chemists, Western Rd., Brighton.

FOR an Agricultural business in a market town.—A Junior ASSISTANT, accustomed to above class of trade. If competent to Extract Teeth preferred. Apply, stating age, height, salary required, to H. C. WEBB, Pharmaceutical Chemist, Buckingham, and enclosing carte, to be returned.

IMMEDIATELY. — An ASSISTANT, who has been used to a first-class Dispensing and Family business. Must be a neat and accurate Dispenser. State every particular as to last situation. A JUNIOR also required. Address, in first place, marked private, Mr. BUTLER, Broomgrove Rd., Sheffield.

WHOLESALE.—An experienced man for Dry room. Must be a good marker. WYMAN & WESTWOOD, 25, Charles St., Farringdon Rd., London.

OUT-DOOR.—Immediately.—An active and obliging ASSISTANT, single, for a brisk ready money business where 3 are kept. Apply, with carte de visite, stating age, height, and experience, to E. J. KITSON, City Drug Stores, Worcester.

FOR the 1st of September.—A thoroughly trustworthy ASSISTANT (in-door), aged about 25 years, to Manage Branch. Must be able to Extract Teeth and Prescribe. State salary required, with carte and references, to GEO. WOOLLEY, Chemist, Sparkenhoe St., Leicester.

ASSISTANTS WANTED.

HEAD Counterman or Warehouseman, accustomed to the Wholesale Drug trade. Apply, by letter, stating age, experience and salary required, to X. Y. Z., care of Mr. C. R. Brown, 40, Sun St., Finsbury, E.C.

JUNIOR, about 19, beginning of August, in a light Retail and Dispensing business, with very short hours. Unusual time for study or recreation given to a gentleman of good appearance and obliging habits. Photo., references, &c., to Frank Cox, Woking, Surrey.

EXPERIENCED and energetic Assistant. Out-door and no Sunday duty. A comfortable permanency for a trustworthy man. State full particulars to W. D., 8, St. Paul's Sq., Southsea.

IMMEDIATELY.—Thoroughly efficient man to take charge of a country business for about a week. Must have good references. State full particulars and terms (out-door) to J. D. Lawton, Hebden Bridge, Yorkshire.

A COMPETENT Assistant for an English Pharmacy in a French seaport. Comfortable home. Apply, personally, or send carte, with full particulars, to H. L. Jackson, 457, New Cross Rd., S.E.

AN Assistant in a Retail and Dispensing business in the country where 3 Assistants are kept. Must be accustomed to a first-class business. Inclose photo. (which will be returned), and state age, salary, and other particulars to M. P. S., care of Messrs. Hearon, Squire & Francis, 5, Coleman St., London.

A THOROUGHLY competent Assistant of gentlemanly appearance and address. Chiefly for the Dispensing Counter in a South Coast business. Three others employed. Full particulars to S. C., Messrs. Maw & Co., 11, Aldersgate St., E.C.

ST. LEONARD'S.—A gentlemanly Assistant well accustomed to first-class Dispensing business. Apply, with carte and usual particulars. Jameson & Curtis, Hastings.

APPRENTICE, also an Assistant for half time. Apprentice would have every opportunity of learning every branch of the trade. Be treated in every way as one of the family. Time allowed for study and attending lectures. Only 10 minutes walk from Wills' College. Reference allowed to former pupils. Address, J. E., 74, Deacon St., Walworth Rd., S.E.

ABOUT first week in August.—In a Mixed country business, a respectable and steady young man, who can Dispense well and has good references. Apply, with all particulars, to K. K., Messrs. Barclay & Sons, 95, Farringdon St.

AN Assistant, about 22 years of age, accustomed to a good class country Family trade. Apply, stating terms, &c., to F. B. Fletcher, 9, The Sq., East Retford, Notts.

BRISTOL Royal Infirmary.—An Assistant Dispenser. Salary £45 per annum, with board, lodging, and washing. Age not more than 26. The Minor qualification of the Pharmaceutical Society, or the Dispenser's qualification of the Society of Apothecaries is requisite. Copies of 3 recent testimonials essential. Particulars as to duties can be obtained by applying to the Dispenser.

IMMEDIATELY.—A good Improver or Junior. Must be active, steady, obliging to customers, and willing to make himself useful. Apply to J. Holloway, Chemist, Finsbury Rd., Wood Green, N.

ASSISTANT, competent to the duties of good market town business, and capable of Management as required. Hours are easy and but little Sunday duty. Apply, with all particulars and references, and enclose carte, to C., care of Barron & Harveys, Giltspur St., London.

ASSISTANTS WANTED.

IN Sussex. At once.—A young man as Junior in a good class country business. Hours from 7·30 to 8 p.m. No duty. Age 18 to 20. One just out of his time not objected to. Apply, in the first instance, stating salary required, &c., to Statim, care of Messrs. Hodgkinson, Stead & Treacher, 198, Upper Whitecross St., London, E.C.

JUNIOR or Improver. Indoors. Short hours. State age, salary required, reference and length of time in the business. Apply to Beach & Co., Bridport.

AN obliging and energetic Junior Assistant accustomed to, or wishing for experience in good country trade. Also an Improver. Apply, stating all particulars, to Corfe, Chemist, Maidstone.

AN Assistant about 22 or 23, for a good class Retail and Dispensing business. Apply, stating usual particulars, to E. Power, Chemist, Walton-on-Thames.

A COMPETENT Assistant, conversant with French, for West-end business. Also a Junior who has had experience in good houses. Pharmacist, care of American Exchange in Europe, 449, Strand, W.C.

BY a Pharmaceutical Chemist, a thoroughly qualified Assistant as leading Counterman in a first-class establishment. Experience and good address essential. Application by letter addressed T. R. care of Messrs. Hodgkinson, Stead & Treacher, 198, Upper Whitecross St., London, E.C., stating height, age, &c., and salary required, in-door.

IMPROVER or Junior wanted. Ample time for reading. Would suit one preparing for Minor. Apply, personally if possible, to J. D. Miller, 1, St. Ann's Rd., Royal Cres., Notting Hill, W.

CHARLES H. WARNER & CO., 55, Fore St., City, have an out-door vacancy for a qualified Assistant. Hours easy, and no Sunday duty. Apply in first instance by letter only.

FOR a first-class pharmaceutical establishment in a fashionable inland watering place a quick and accurate Dispenser of gentlemanly manners and address. Applications to be addressed to A. B. & Co., &c., Messrs. Hodgkinson & Co., 198, Upper Whitecross St., London, E.C.

EARLY in August, a qualified Assistant. Apply, stating age, height, references and other particulars, to Mr. Dampney, 87, Abingdon Rd., Kensington, W.

IMMEDIATELY.—An experienced indoor qualified Assistant, who has been accustomed to a good country trade. Apply, stating age, salary, and references, to Chemicus, Ferndale, Pontypridd.

FOR August 1st.—An indoor Assistant not under 21 years of age, for first-class Retail business. An accurate Dispenser and good Counterman. State full particulars as to height, salary, age, with photo, to J. C. Sargent, 5, Fore St., Taunton.

BY the middle of August.—For a seaside business, near London. A gentlemanly Assistant, not under 22 years of age and accustomed to good class Retail trade. Apply, enclosing carte (which shall be returned), to M., Messrs. Herrings & Co., Aldersgate St., London.

CHEMIST and Dentist, as Manager for a widow. Qualified in both branches preferred. In-door. Must be sober and have good references. Apply, with all particulars as to age, height, salary, &c., enclosing carte, to Arthur Peake, Chemist and Dentist, Earlestown, Lancs.

A JUNIOR Assistant in a light Retail and Dispensing business. Time for study if required. Apply, with full particulars, and carte (to be returned), to J. T. Smith, 39, Market St., Wellingborough.

ASSISTANTS WANTED.

AN energetic gentlemanly ASSISTANT, with qualification preferred, in first class Retail and Dispensing business in the suburbs. Address, RUPERT H. CUMINE, Forest Gate, London.

IN a week or 10 days.—A JUNIOR, about 22. Good Dispenser. Apply, stating terms, references, &c., carte if possible, to R. PETTMAN, 49, Northumberland Rd., Margate.

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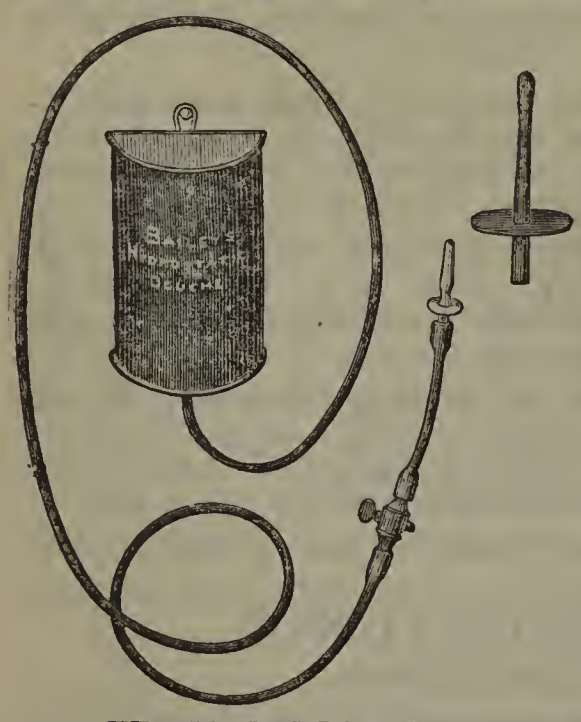

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 735.] SATURDAY, JULY 26, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
Decoction and Infusion of Cinchona Bark. By B. H. Paul, Ph.D.	61
The Galenical Pharmacy of the New Pharmacopée Francaise (*continued*)	62
Examination of Glycyrrhiza Extracts. By Luther J. Schroeder	64
Report of a Sub-Committee of the Dimbula Planters' Association on Cinchona	65
Géromé Cheese	66
Tasteless and Odourless Solution of Ammonium Valerate. By R. Rother	66
Chemical Nature of Starch Grains	67
Patent Medicine Statistics	67
List of Petitions presented for the Amendment of the Medical Acts Amendment Bill	68
EDITORIAL ARTICLES AND NOTES:—	
Annual Report of the Inland Revenue Commissioners	69
Notes:—The Medical Acts Amendment Bill — International Inventions Exhibition for 1885—Poisonings in Canada—Adulteration Act for Canada—Preliminary Examination in New York	70
TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY:—	
Examinations in London	71
The Preliminary Examination	72
Examinations in Edinburgh	74
PROCEEDINGS OF SCIENTIFIC SOCIETIES:—	
School of Pharmacy Students' Association	75
International Health Exhibition:— Conferences on Relation to Health	76
Conference of the St. John's Ambulance Association	77
Conference of the Epidemiological Society	78
REVIEW:—	
Reynolds' Experimental Chemistry	79
CORRESPONDENCE:—	
Destruction of British Flora	79
Permanganate of Potash Pills, with Paraffin, Vaseline and Kaolin as an Excipient	80
The Representation of Chemists on the Pharmacopœia Committee	80
Answers to Correspondents	80

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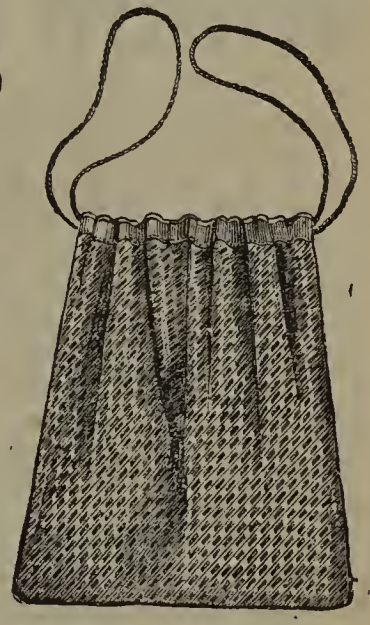

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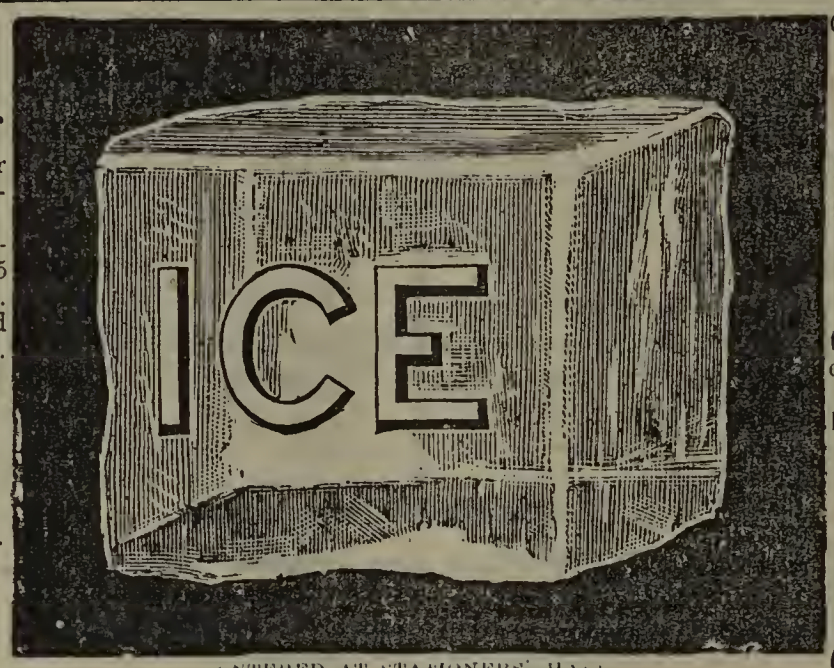

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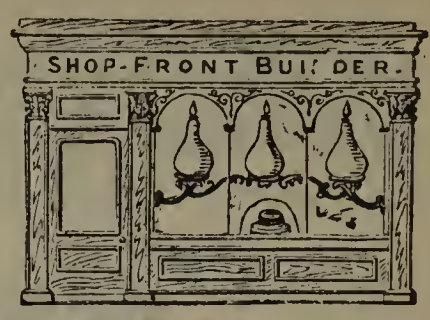

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No.	*Description.*	*Pieces per Case.*	*Price per Case.*	*Price per ½ Case.*	*Price per ¼ Case*
	HONEYCOMB.		£ s. d.	£ s. d.	£ s. d.
1	SELECTED QUALITY... ... Assorted Sizes...	100	17 17 0	8 19 0	4 10 0
2	FINE ,, ... ,, ...	100	14 9 6	7 5 6	3 13 6
3	SECOND ,, ... ,, ...	100	11 16 6	5 19 0	3 0 0
4	THIRD ,, ... ,, ...	100	9 4 6	4 13 0	2 7 0
5	ROUGH, FOR STABLE USE ,, ...	100	6 12 0	3 7 0	1 14 0
6	,, ,, Smaller Assorted Sizes...	100	3 17 0	1 19 0	.....
7	SELECTED QUALITY... Medium Bath Sizes...	26	8 18 0	4 10 0	.....
8	GOOD ,, ... ,, ,, ...	26	5 16 0	2 19 0	.....
9	SELECTED ,, ... Large ,, ...	18	8 8 0	4 5 0	.....
10	GOOD ,, ... ,, ,, ...	18	5 12 0	2 17 0	.....
11	FIRST ,, ... Small...	200	4 8 0	2 5 0	.....
12	SECOND ,, ... ,, ...	200	2 5 0	1 3 6	.....
	TURKEY.				
13	CUPS, FIRST QUALITY ... ... Bath Sizes...	40	17 16 6	8 19 0	.....
14	,, SECOND ,, ... ,, ,, ...	40	13 14 6	6 18 0	.....
15	,, FIRST ,, ... Toilet ,, ...	100	31 12 0	15 16 6	7 19 0
16	,, GOOD ,, ... ,, ,, ...	100	23 14 0	11 17 6	5 19 0
17	,, SECOND ,, ... ,, ,, ...	100	18 10 0	9 6 0	4 14 0
18	,, USEFUL PIECES ... ... ,, ,, ...	100	13 5 0	6 13 0	3 7 0
19	,, FIRST QUALITY ... Nursery Sizes...	200	13 18 0	7 0 0	3 10 6
20	,, SECOND ,, ... ,, ,, ...	200	8 15 6	4 8 0	2 4 6
21	SOLID, FIRST ,, ... Toilet ,, ...	200	18 10 0	9 6 0	4 14 0
22	,, SECOND ,, ... ,, ,, ...	200	12 5 0	6 3 0	3 2 0
23	,, FIRST ,, ... Nursery ,, ...	200	10 12 0	5 7 0	2 14 0
24	,, SECOND ,, ... ,, ,, ...	200	5 5 6	2 13 0	1 7 0
25	BROWN, FINE ,, ... Assorted ,, ...	200	5 18 6	3 0 0	1 11 0

S. MAW, SON & THOMPSON,

LONDON.

SYDNEY, NEW SOUTH WALES,

JUNE 11, 1884.

ENO'S FRUIT SALT IN EQUITY.

Before his Honor the PRIMARY JUDGE.

ENO *v.* DAVIES AND ANOTHER.

Mr. J. E. Solomon, Q.C., and Dr. Donovan, instructed by Mr. De Lissa, for the plaintiff; Mr. Owen, Q.C., and Mr. Nash, instructed by Messrs. Bull and Bull, for the defendants.

This is a suit instituted by James Crossley Eno, of Pomeroy Street, Hatcham, Surrey, England, to have the defendants, William Davies and James Channon, trading as William Davies and Co., Goulburn, and Harbour Street, Sydney, ordered to take a certificate of registration for a trade mark called "The Australian Fruit Salt" off the file at the Registrar General's office, and also to have them restrained by perpetual injunction from using the title to any other commodity. The plaintiff claimed that the trade mark was an infringement of his own, viz., Eno's Fruit Salt, Fruit Saline, and Fruit Powder. Consequential damages were also claimed. The defendant's mark was registered in this Colony two months before plaintiff's.

His Honour, in giving judgment, said he had no doubt that the case came within the principle laid down in the cases which had been cited wherein the Court enjoined a defendant not to continue the use of his trade mark. Although there were some important points of distinction in the goods, still there were points of resemblance which were calculated to induce persons to believe that they were obtaining the plaintiff's, when in reality they were buying the defendant's. The bottles were about the same weight and shape, and a purchaser of the defendant's would hardly know he had not got Eno's until he opened the package. Looking at the two bottles, he thought purchasers were exceedingly likely to be misled, because a man was not supposed to carry his last bottle with him in order to see that he was getting the same article, and persons buying were not supposed to be always suspicious that frauds were being practised upon them. He considered the term "fruit salt" sufficiently distinctive to be in itself a trade mark, and it had been proved in evidence that people generally asked for it by that name. The resemblance in the bottles and in the printing on the wrappers was so close that he regretted he could not say that it resulted from accident or was consistent with innocence. The distinctions seemed to have been carefully studied in order to escape, if possible, the results of imitation. The defendants had brought out their article just when the plaintiff's had taken a gigantic jump in public estimation, and had acted in such a way as to induce him to believe that they intended to lead the public to think they were buying plaintiff's goods when they were served with theirs. There was fraud which tradespeople unfortunately did not think much of, but which the Court always regarded with the greatest reprehension. He did not think the argument as to the second section of the Act had very much to do with the case. When the defendant registered he must have obviously known that Eno's Fruit Salt was in the market. He had no more right to register than he had to sell. He did not think the Act in any way interfered with the powers which the Court of Equity possessed before it became law. The Act had only been passed to afford a speedier and readier remedy to those who registered under it. The seventh section evidently contemplated that such a suit as the present one should be taken by a person who considered he had been wronged, as the plaintiff had been. He would grant the injunction in the terms of the prayer, restraining the defendants from using the trade mark, on the ground that it was an infringement on the plaintiff's prior and exclusive claim. He would order them to take such proper and necessary steps as were possible to take the certificate of registration off the file, but if a power greater than theirs stood in the way in the matter, they would be relieved from attachment. He did not see how he could compel the Registrar-General, who was an officer appointed by Parliament, to do a certain thing, to cancel the certificate, especially as he had not been made a party to the suit. The certificate, however, could be delivered up, because it was part of the subject matter of the suit. He would order the defendants to pay costs up to the hearing, and would direct an issue as to consequential damages to be tried before a special jury of four in the Jury Court on a day to be named. He would make the question of costs of these further proceedings dependent upon the result, because it might be that he would not give plaintiff his costs if he did not recover a substantial amount.

CAUTION.—Legal rights are protected in every civilized country.

Sold by all Chemists. Directions in Sixteen Languages how to Prevent Disease.

Prepared only at Eno's Fruit Salt Works, Hatcham, London, S.E., by J. C. Eno's Patent.

DECOCTION AND INFUSION OF CINCHONA BARK.

BY B. H. PAUL, PH.D.

On a previous occasion incidental reference was made to the relatively small quantity of alkaloid present in the infusion and decoction of cinchona bark as compared with that contained in the bark used in making those preparations, and as it seemed desirable to examine this subject more fully, I have carried out a series of experiments with a number of different kinds of cinchona bark.

Setting aside that official variety of bark, commonly known by the term "flat calisaya," as being practically a thing of the past, I have operated chiefly upon samples corresponding more or less with the other variety prescribed in the British Pharmacopœia for making infusion and decoction. Cinchona bark of this description is now abundant, but the very wide range of difference in the amount of alkaloids present in different samples constitutes a practical difficulty in the selection of a sample suitable for pharmaceutical purposes. Some of the unusually rich kinds, such as the Ledger bark of Java, Ceylon and British India, are too rare to be altogether fitting for this purpose, while, on the other hand, bark is often met with which is almost destitute of alkaloid, though presenting external characters that alone would recommend it for use. I have, therefore, in all cases operated with bark selected on the more accurate basis of analysis, the results of which are stated below:—

	1	2	3	4	5	6
Quinine . . .	4·62	1·02	4·38	4·18	5·50	3·46
Quinidine . .	—	—	—	—	·37	·11
Cinchonidine .	·27	1·29	·28	0·64	—	·91
Cinchonine . .	·10	·68	·25	·30	·20	·34
Amorphous . .	·22	·60	·38	·40	·40	·44
	5·21	3·59	5·29	5·52	6·47	5·26

These figures sufficiently show the differences which obtain in regard to the amount and relative proportions of the alkaloids contained in cinchona bark, and the samples referred to above were chosen as well calculated to furnish the information required as to the representation of the medicinal properties of the drug by the decoction and infusion.

Decoction made according to the directions of the British Pharmacopœia, with the sample of bark No. 1, gave the results shown in the following table:—

	In 1 pint decoc. Grains.	Left in bark. Grains.	In 1½ ozs. orig. bark. Grains.
Quinine	3·41	21·89	25·30
Cinchonidine . .	·41	1·06	1·47
Cinchonine . . .	·31	·23	·54
Amorphous . . .	·41	·75	1·16
	4·54	23·93	28·47

With the bark No. 2, the results were as follows:—

	In 1 pint decoc. Grains.	Left in bark. Grains.	In 1½ ozs. orig. bark. Grains.
Quinine	1·05	4·50	5·56
Cinchonidine	1·79	5·31	7·10
Cinchonine	·76	2·94	3·70
Amorphous	·57	2·75	3·31
	4·17	15·50	19·67

No. 3 gave—

	In 1 pint decoc. Grains.	Left in bark. Grains.	In 1½ ozs. orig. bark. Grains.
Alkaloids	6·5	22·4	28·9

No. 4 gave—

	In 1 pint decoc. Grains.	Left in bark. Grains.	In 1½ ozs. orig. bark. Grains.
Alkaloids	10·3	19·89	30·19

No. 5 was a fine sample of Ledger bark from Java; it gave—

	In 1 pint decoction. Grains.	Left in bark. Grains.	In original bark 1½ ozs. Grains.
Alkaloid	15·5	19·9	35·4

No. 6 was a mixture of natural and renewed Crown bark grown in India; it gave—

	In 1 pint decoction. Grains.	Left in bark. Grains.	In original bark 1½ ozs. Grains.
Alkaloids. . . .	8·33	20·44	28·77

It will be evident from these data that in making decoction of bark only small proportions of the alkaloids present in the bark used are made available medicinally, much the greater portion being left in the residual bark. Consequently, the decoction is a very wasteful preparation as regards this portion of the medicinal value of cinchona bark. At the same time it must be mentioned that there is a further deviation from the natural proportions of the constituents of the drug, inasmuch as those which are readily soluble in water preponderate in the decoction as much as the alkaloids are deficient.

In this respect the defects of the decoction of bark resemble those previously pointed out as appertaining to the liquid extract made by the process directed in the British Pharmacopœia. The product obtained in either case is not a normal representation of the material from which it is made, but relatively the decoction is in this respect a better preparation than the liquid extract.

Infusions prepared, as the B.P. directs, from the samples of bark Nos. 4, 5 and 6 gave the following results:—

	Grains.	Grains.	Grains.
Alkaloid in 1 pint of infusion . . .	9·50	12·86	6·08
Alkaloid in 1 oz. bark	24·15	28·30	23·01
Alkaloid left in bark	14·65	15·44	16·93

When it is remembered that the bark used in the foregoing experiments was of a better description than that commonly taken for the preparation of infusion or decoction, it can easily be understood that these preparations are often inferior in medicinal efficacy, and that much uncertainty may attend their use. This is a defect which necessarily attaches to all galenical preparations, unless they are made with special regard to the composition of the materials employed and to the chemical features of the processes followed. Whether these points can be taken into account sufficiently to remedy such defects, or whether the labour of doing so would exceed the advantage to be gained, I leave for the consideration of practical pharmacists. In any case it seems, from a common-sense point of view, desirable that the efficacy of medicinal preparations should not be left to chance in any degree, but regulated and rendered as far as possible uniform by precise knowledge of their composition.

THE GALENICAL PHARMACY OF THE NEW PHARMACOPÉE FRANÇAISE.

(*Continued from page* 43.)

Chocolats are not with us pharmaceutical preparations. Ferri subcarb. has replaced powdered iron filings in the Chocolat Ferrugineux; those of Iceland Moss and Salep have been withdrawn.

Collodion is now made by dissolving Gun-cotton (5) in Ether (75) and Alcohol (20). Flexile Collodion may be obtained by adding a fifteenth of its weight of Castor Oil to the above or about 7 grams for the quantities just indicated. A formula for Gun-cotton is also given.

Collutoires are semi-liquid applications for the gums and inside the mouth. They are those of Borax, Alum, and Potassium Chlorate with Honey of Roses, 1 : 4. Stir before use. Soothing syrup would be a fairly correct translation of the French term; our own have not yet acquired the dignity of being pharmacopœial preparations.

Passing over medicated *Cigarettes*, in which the Cigarettes de camphre de Raspail are not included, we come to—

Collyres, Collyria or ophthalmic remedies which are either solid or liquid, and are not distinctive.

Conserves are four in number, Cochlearia, Cynorrhodon, Red Rose and Tamarind. Cassia fistula has been withdrawn.

Coton Iodé, Xylum iodatum, is a new preparation—

Carded cotton, very white and thoroughly dry	25 grams.
Finely powdered iodine	2 grams.

Distribute the iodine as uniformly as possible throughout the cotton, and place the whole in a wide-mouth stoppered flask of the capacity of a litre. Place the flask for several minutes in nearly boiling water so as partially to expel the air; then insert and fasten the stopper. Expose for at least two hours to a temperature bordering on 100° C. The vaporized iodine will condense on the cellulose after the manner of a dye. The flask not to be opened till quite cold, when all the iodine, about 8 per cent., will be fixed on the cotton. Keep in stoppered bottle.

Crayons Médicamenteux, Medicated Pencils, are new, at least under this title. Crayons d'Azotate d'argent are an application of the old Nitrate d'argent fondu; Fused Silver nitrate. Weaker forms are ordered (Nitrate d'argent mitigé) with 10 per cent. fused nitre. Also pencils containing a third, half or a quarter of silver nitrate.

Crayons de Sulfate de Cuivre (Cupri Sulphas) require a gentler heat; break down the crystals to facilitate their fusion.

Crayons de Tannin.
Tannin Pencils.

Powdered tannin	10 grams.
Powdered gum arabic	50 centigrammes.
Distilled water / Glycerine	S. Q. (quantité suffisante), as little as possible.

Mix the gum and tannin, and make into a mass of pill consistence with glycerine and water. Roll and divide into cylinders of the size required.

Eaux Médicinales have undergone revision and the descriptive text is new. They are divided into (1) Distilled Waters, and Aromatic Medical Waters; and (2) Simple and Compound Solutions. Others are included owing to their traditional names. In this section alphabetical arrangement mingles all classes into one.

Eaux distillées, or Hydrolats (Hydrolata), depend chiefly on the volatile principles of the plants from which they are derived; for the most part volatile oils or acids; and steam is usually employed in the process of distillation. These distillates easily undergo change and are directed to be kept in well-filled glass-stoppered bottles. This is entirely opposed to laboratory experience; a certain amount of aëration is indispensable to perfect conservation. And while the remark is true that keeping much improves their quality, and specially in the case of aromatic waters, it is equally true that these distillates put into bottles from which the air is practically excluded, remain for months in an unchanged that is, in an unimproved condition.

It is recommended to add 10 centigrammes of sulphate of alumina to a litre of Aqua destillata previous to distillation and to reject the first runnings. Eau distilleé de Laurier-Cerise (Aqua Lauro-Cerasi) is retained. The uncertainty of its composition has long banished it from our Pharmacopœia; but a mode of titration is subjoined in order to render constant the proportion of hydrocyanic acid which the preparation should contain.

Eau de Goudron, Aqua Picea (Tar Water), is thus made—

Vegetable tar	5 grams.
Fir-wood shavings	15 „
Distilled water	1000 „

Macerate for four-and-twenty hours, stirring occasionally, and filter. It should have a slightly acid reaction.

Avoid common water else sulphuretted hydrogen would be evolved. This is the "rational formula" mentioned in the preface.

Eau Sédative.

Liquor ammoniæ	60 grams.
Camphorated alcohol, (Camphor, 1:9, alcohol at 90°)	10 „
Sodium chloride	60 „
Distilled water	1000 „

Dissolve the salt in water; add the camphorated alcohol; the ammonia, last. Shake before use.

The other strengths recommended by Raspail, in his 'Manuel de Santé,' are not official.

The Electuaries are beyond our province; the Diascordium, Catholicum and the Thériaque belong to a polypharmacy which characterized mediæval times. Surely the last mentioned should be the object of one of the suppressions said by M. Gavarret to be essential when a Codex aims at translating faithfully the progress of experimental science.

One formula may be quoted—

Electuary of Copaiba.

Balsam of copaiba	100 grams.
Powdered cubebs	150 „
Powdered catechu	50 „
Oil of peppermint	3 „

Mix.

American pharmacy has not influenced the Elixirs of the Paris Codex; they are few in number, and though defined as certain mixtures of a syrup with an alcoholic tincture, the series includes others, the traditional names of which have been retained.

The term Elixir has long ceased to possess any definite meaning, and a more scientific nomenclature has been adopted.

Élixir Parégorique is the old Dublin form, 5 centigrammes of Extract of Opium being contained in 10 grams of tincture.

Elixir de Pepsine.
(New preparation).

Pepsine médicinale	50	grams.
Or pepsine extractive	20	„
Distilled water	450	„
Alcohol at 80°	150	„
Simple syrup	400	„
Oil of peppermint (or other)	q. s.	

The pepsine suspended in the water is added to the syrup and alcohol in which last the flavouring essential oil has been dissolved.

Test for activity is added, the same as ordered for the wine, which to avoid repetition will be found under that heading.

The formula has been justly criticized by French writers on account of the flavouring ingredient being left to the discretion of the pharmacien; this impairs its official character, and is sure to create unsatisfactory variations and inconvenient results.

Emplâtres, Emplastra, are divided into two classes: (1) Those having for a base a soap of oxide of lead, and which may be termed true Plasters. When sufficient heat has been employed to render these of a brown colour, they are called Emplâtres brûlés. (2) Emplâtres résineux, which differ only from ointments in having more consistence. These plasters, known chiefly by their popular names, have a restricted interest and need not be discussed.

Emplâtre Diapalme contains sulphate of zinc; Emplâtre Mercuriel is a complicated formula; Emplâtre Vésicatoire is occasionally ordered with sufficient camphor dissolved in ether sprinkled on the surface. By magdaléons is meant cylindrical shapes, or rolls.

Alphabetical arrangement causes the Sparadraps, which are simply plasters spread on some material, to be entirely separated from Emplastra. The well-known Mouches de Milan are a good example, being perfumed blister plaster directed to be spread on thin black silk. It is recommended, unless specially ordered to the contrary, to send out the mass in little flattened balls, wrapped up in the materials to be used. When wanted, spread the blister, taking care to leave a margin. A difference must exist between French and English dispensing pharmacy. Proceeding in this manner we should probably see that emplastrum vesicans once more.

Sparadrap de Cire, or Toile de Mai, is composed of white wax, turpentine and oil of almonds spread in lengths.

Sparadrap de Colle de Poisson, is better known as Taffetas d'Angleterre; our Court Plaster. La Baudruche gommée is Goldbeater's Skin spread with isinglass. The Sparadrap de Thapsia is very frequently employed.

Émulsions have received very scant attention, and if these difficult preparations must be confided to the skill and judgment of the dispenser, still the withdrawal of the emulsions of castor oil, jalap resin, and scammony, all of which figured in the Codex of 1866, cannot be regarded as an advantage.

We have now Milk of Almonds which was the old Émulsion Simple; and the Emulsions of Balsam of Tolu and of Coal-tar. Tincture of Quillai Bark (Panama) is ordered in the emulsion of Tolu, and it is an excellent emulsifying agent. Dissolve the balsam in alcohol at 90°; add the tincture, and gradually the water. *Eau chaude* is specified in order to retard precipitation. Unfortunately the formula for the tincture of quillai is not given and the pharmacien is left in a most embarrassing position. A Teinture de Quillaya coal tarée (Coal-tar 1, Tincture Quillai 4) is inserted for the purpose of making the last-mentioned emulsion. Emulsions are hardly official preparations, nor of pharmacopœial importance; were they so, the omission of the chief agent ordered would be reckoned as a serious oversight.

Espèces.—Spécies are mixtures of various herbs and flowers cut up into small fragments when dry, and used for infusions, decoctions and similar preparations. Nine selected specimens remain. Esprits are classed under Teintures d'Essences; and Huiles Volatiles replace the old term of Essences.

Extraits. Extracts, watery, alcoholic or made with ether. The Table of the Quantity of Extract produced by one kilogram of substance has been suppressed, as its indications were not considered sufficiently correct. The general subject of the preparation of extracts is said to have received special attention, though the text itself is not much altered. The Extrait de Fèves de Calabar, mentioned as a novelty, belongs to the old Codex. The term Rob, which formerly designed extracts made from the juices of fruits, has disappeared. When the same substance yields an aqueous and an alcoholic extract, the spirit-preparation is considered the more active; but when no special indication is given by the prescriber, the aqueous should be dispensed.

Extract of Belladonna (from the leaves) forms the type of a group of concentrated juices, Extrait de Cigüe (Conium); Jusquiame (Henbane), Laitue vireuse (Lactuca virosa, in stalk), and Stramoine (Stramonium leaves) being made after the same pattern. Bruise and press: heat and separate the albumen with the chlorophyll; evaporate to a third and allow it to deposit for twelve hours. Separate the deposit and evaporate to a soft extract. For the Alcoholic Extract of Belladonna, the second edition orders root, not seeds; but the leaves are used both for the tincture and the syrup.

Extrait de Cubèbe.
(New preparation.)

Pulv. cubebæ	1
Rectified commercial ether	2
Alcohol at 95°	2

Percolate first by ether, then by alcohol. Distil the two tinctures separately; evaporate the alcoholic residue over the water-bath, and mix the products of both operations. 1000 grams of powdered cubebs yield about 200 grams of oleo-resinous extract.

Extrait de Muguet (Aqueux).
Watery extract of Convallaria maiälis.
(New Preparation.)

Stalks and flowers freshly gathered and dried with one-third quantity of leaves and roots. Cut and infuse twelve hours in six times the weight of distilled water. Press and repeat the operation. Mix the two liquors and evaporate to a soft extract. Dissolve this in sufficient cold distilled water; filter and evaporate over the water-bath to the consistence of a hard extract.

Extrait de Muguet (avec le suc).

Extract of Convallaria made from the juice: the same parts of the plant are used, but operated on fresh. Express and treat in the same manner as other extracts made from the fresh plant, always taking the precaution to dissolve the soft extract; filter and evaporate to a hard extract.

This mode of operation may be recommended in other cases. It was used with success by the late

Sir B. Brodie in making Ext. Pareiræ Bravæ. When employed, the keeping properties of an extract are much improved as well as the general appearance.

Extrait de Seigle Ergoté.
Extract of Ergot of Rye
(New preparation.)

Ground ergot	1000 grams.
Distilled water	5000 grams.

Place the ergot in a percolator with twice its weight of water; macerate twelve hours, and let the liquid pass. Heat over a water-bath, and separate the coagulum. Exhaust the marc with the remaining water and evaporate to a syrupy consistence. Put both liquors into a flask of double capacity, and add alcohol at 90° till the liquid ceases to be transparent. Shake; the insoluble particles will fix on the sides of the flask. Decant and evaporate to the consistence of a soft extract.

Fumigations may be produced by all substances capable of volatilization, and are used either to mask bad odours, or to remove the cause, and thus to be true disinfectants. Sometimes they have a distinct medical effect. Thus we get Carton Fumigatoire and Papier Nitre, both used in asthma; the Fumigations of Sulphurous acid and of Chlorine gas; paper steeped in arseniate of soda and smoked as cigarettes; and Clous Fumants or Pastilles. The formula for the last is good: Gum Benzoin (8); Balsam of Tolu (2); Yellow Sandal (2); Vegetable Charcoal (50); Nitrate of Potash (4); and Mucilage of Gum Tragacanth, *q.s.*

In the case of fumigations by means of sulphurous acid and of chlorine (Fumigation Guytonienne) the quantity to be employed for a given space or room, has been carefully indicated.

Gargarismes.—Gargles we should rather class with Hospital Formulæ, together with sundry other Codex preparations. Gargle of Potassium Chlorate is now $KClO_3$; 5 (vice 10) Aqua Destillata (250) and Syrup. Mori (50), or 1, 50, 10.

Gelées.—Jellies call for but one remark. The jelly of Iceland Moss, a favourite remedy, is made with a Saccharure described hereafter; but the Gelée de Lichen amère is made by substituting 150 grams of decoction of *unwashed* lichen (Cetraria Islandica, 5 grams) for the same quantity of distilled water.

Glycerées.—Glycerina have become familiar preparations; the proportions ordered have undergone slight alterations. The Glycerées d'Extrait de Belladonne, Cigue (Conium), Jusquiame (Hyoscyamus) and d'Opium are now: Extract 1:9 Glycerinum Amyli. The form for the latter, which serves as a general base, is—

Powdered Starch	10
Glycerine	140

Mix by gradual heat secundum artem.

The Glyceroles of Goudron (Tar), Iodure de Potassium Iodure (KI+I), and of Sulphur, have been excluded. Gouttes Noires Anglaises, Black Drops, have excited severe comment in consequence of 30 grams of sugar being misprinted for 50. The error has been corrected in the second edition. Acetic acid, 1·060 replaces distilled vinegar, but water is added to equalize the strength. Black drops represent the half of their weight of opium, or the quarter of extract of opium. One part equals 2 parts of Rousseau's Laudanum, and 4 parts of the Laudanum of Sydenham. Strychnos Ignatii forms the base of the Gouttes Amères de Baumé.

(*To be continued.*)

EXAMINATION OF GLYCYRRHIZA EXTRACTS.*

BY LUTHER J. SCHROEDER, PH.G.

The author procured eight samples of liquorice, comprising the most prominent brands of foreign manufacture as well as several of American make. The examination was confined to the determination of matter insoluble in cold water, of glycyrrhizin soluble in water and of glycyrrhizin soluble in ammonia. Five hundred grains of (air-dry?) extract of glycyrrhiza were macerated in 12 fluid ounces of cold water for twenty-four hours, the mixture was transferred to a filter, and the insoluble matter well washed until the filtrate passed colourless, dried (at what temperature?) and weighed. The residue of No. 1 was lightest in colour and very smooth; 5 and 6 were somewhat darker and the others were much darker and gritty. The filtrates (diluted to a uniform amount?) likewise varied much in colour and taste, those from 1, 5 and 6 being dark coloured and of a fine flavour, and the remainder lighter coloured and less pleasant; that from 8 had a peculiar acrid taste. These filtrates (without further concentration?) were precipitated with diluted sulphuric acid, the precipitates collected upon a filter, washed with acidulated water, redissolved in ammonia and reprecipitated by sulphuric acid, this operation being repeated several times; the precipitate was finally washed and dried.

The portion insoluble in cold water was treated with diluted ammonia, the filtrate precipitated by diluted acid, and the precipitate purified by redissolving and reprecipitating several times, taking care to frequently filter to take out impurities (?). The results are tabulated as follows, 500 grains being used in each case:—

Brand.	Residue.		Glycyrrhizin.		
	Weight.	Per cent.	Soluble.	Insoluble.	Total.
	Grains.				Grains.
1. M. and R. .	180	36	38	5	43
2. Y. and S. .	174	34·8	30	10	40
3. Dean . . .	239	47·8	8	5	13
4. Royal . . .	274	54·8	6	3	9
5. Corigliano .	150	30	15	15	30
6. Guzzolini . .	132	26·4	10	7	17
7. P. and S. . .	125	25	10	11	21
8. S. C. . . .	130	26	—	13	13

Remarks on the preceding paper by the Editor of the American Journal of Pharmacy:—

The results obtained by Mr. Schroeder, as given in the preceding paper, although absolute correctness is not claimed for them, nevertheless appear to possess considerable pharmaceutical interest. Since uncombined glycyrrhizin is sparingly soluble, not entirely insoluble, in cold water and dissolves freely in boiling water, it is evident that the loss of this compound has been the greater the more frequently purification was attempted by resolution in ammonia and reprecipitation by acid. Sestini, in 1878, showed that fresh liquorice root containing 48·7 per cent. of moisture yielded 3 27 per cent. of glycyrrhizin, which is equal to 6·37 per cent. for the dry root. Delondre, in 1856, obtained from liquorice root by successive treatment with cold water, boiling water, and steam, 15, 7·5 and 16, or a total of 38·5 per cent. of extract, which, if all the glycyrrhizin is present, would contain about 16·5 per cent. of this compound. The largest amount obtained by Mr. Schroeder's process was 8·6 per cent. A portion of this deficiency is due to the water present in the commercial extract, which Madsen (*Pharm. Journ.* [3], xii., 405) found to vary between 10·5 and 16·5 per cent.

That different lots of the same brand of liquorice vary to some extent has been repeatedly shown. Mr. Madsen in examining six samples of "Baracco" liquorice (air-

* From the *American Journal of Pharmacy*, June.

dry) found the matter insoluble in cold water to vary between 21·1 and 37·5 per cent.; extract soluble in water and reprecipitated by alcohol, 26·65 to 45·60; ash, 6·06 to 14·23; sugar, 7·33 to 15·17, and arabin, 1·52 to 10·49 per cent. Determinations of insoluble matter in liquorice were made by W. N. Martindell (*Am. Jour. Phar.*, 1873, p. 151); the figures obtained by him for 500 grains of commercial extracts, as compared with Mr. Schroeder's results. are as follows:—

Corigliano	218 gr. M., 150 gr. S.
Guzzolini	175 gr. M., 132 gr. S.
P. and S.	248 gr. M., 125 gr. S.
M. and R.	116 gr. M., 180 gr. S.

The U.S. Pharmacopœia requires that not less than 60 per cent. of the extract should be soluble in cold water. The water naturally present in the extract is obviously included in the soluble matter. The German Pharmacopœia states that 700 parts of the extract, dried at 100° C., must leave a residue weighing at least 83 parts (=not over 17 per cent. of moisture); and when the air-dry extract is exhausted with water of not more than 50° C., the insoluble residue, after being dried in the water-bath, should not exceed 25 per cent. Calculated for the dried extract, the limit of insoluble matter is 30 per cent., and the requirement of the U.S. Pharmacopœia should likewise be interpreted as being for the extract dried at 100° C. But if it be conceded that the pharmaceutical and perhaps also the medicinal value of extract of liquorice depends upon the glycyrrhizin, the percentage of soluble matter alone can give no indication of the correct value; and a process for accurately estimating the glycyrrhizin is still unknown.

REPORT OF A SUB-COMMITTEE OF THE DIMBULA PLANTERS' ASSOCIATION ON CINCHONA.*

The plan pursued by the Sub-Committee appointed to inquire into the cultivation and harvesting of cinchona has been to send to various estates, where a certain quantity of cinchona was growing, a series of questions referring to all points connected with this subject, hoping in this way to bring together and compare the opinions and experiences of the different managers of estates, and thus to arrive at reliable data.

In an appendix attached to the report will be found an abstract of the answers sent by each estate to the questions given. A number has been given for the purpose of this report to each estate that has sent answers, and that number is used throughout wherever that estate is referred to.

The points on which questions have been asked have been:—1, origin of trees; 2, planting; 3, cultivation; 4, harvesting; 5, coppicing; 6, curing.

The Sub-Committee have arrived at the following conclusions on the above points after going through the answers they have received.

1. With regard to *species and origin*, succirubra and hybrids have answered best chiefly from seed from Hakgala trees, that is, seed procured from Hakgala, from trees grown on estates there. The trees raised from Hakgala cuttings are highly spoken of by those that have them. No difference appears to have been found between seed from shaved and unshaved trees.

2. Plants put into holes have answered generally best, nursery and self-sown plants being equally good. Very few have succeeded in making cinchona grow where it has died before.

3. In *cultivating*, lopping and forking are generally approved of as stimulating the trees, also bulky manure; a gradual lopping of two branches at a time is considered best.

Trees are generally considered to seed early because they are unhealthy or in unsuitable soil; and there appears to be no method in vogue that has stopped the flowering of the tree. Shaving is said by the majority not to increase the tendency to seed, but by some excessive shaving is thought to have that effect. By nearly all cutting off the seed is said to strengthen the tree. By the majority no difference has been noticed between trees raised from foreign and local seed, but by some that have tried it they are considered to be less liable to canker. Canker is said by most to be caused by damp soil, and by some, by the degeneracy of the stock, and successive generations have been found by nearly all to canker more than the original; by most managers no treatment has been found to stop canker; by some, baring the collar has been found to do good, and by some, forking.

4. *Harvesting.*—Shaving is almost universally approved of as the best means of harvesting, and there is a good deal of evidence in favour of stopping shaving when the tree is five years old. Most have found commencing shaving at three years old the best, but some at two years and some at four years. Covering is universally approved of, grass being the best covering, while in dry weather the covering should be put on immediately after shaving, some recommending an interval between shaving and covering of two months. It appears that generally a part of the cellular bark is left on as well as the liber, and that it is thought best to leave the covering on till the next shave. The majority are of opinion that shaving checks the growth of the tree, especially after five years old, and in some cases it is said to kill the trees. In every case except one an increase of bark is reported between the shavings, and in some cases as much as 50 per cent., but generally speaking, about 20 per cent.

From the answers received original succirubra appears to give 2½ per cent. sulphate of quinine; officinalis about 1¾ per cent.; renewed succirubra about 3¾ per cent.; renewed officinalis at five years old covered 5¾ per cent., and in one case at seven years old 7 per cent. The yield of succirubra is said to be from ⅕ to ⅓ of a lb. per tree.

The best months of shaving are said to be March and April and September and October, and the majority approve of dry weather for covering in. Most managers report that some trees have suffered from the bark rotting after shaving owing to this being done badly or in unfavourable weather; again there is an equal weight of evidence as whether or not this rotting occurs when trees are not covered. The majority are of opinion that trees will renew bark well if shaved after five and a half years old, and, again, most managers say that three is the greatest number of times that they have found trees renew well after shaving.

5. Six years old is considered the best age to *coppice* trees, and between March and May the favourite months, while it is considered best to leave three suckers. Very few stools are said not to throw out suckers after coppicing, and from five to seven years the best interval to leave between coppicing. Coppicing trees is said generally to give three times as much bark as one shaving of them.

6. *Curing.*—Drying in the sun is generally considered the best way of curing; artificial drying by those that have tried it has been found unsuccessful.

The Sub-Committee think it will not be out of place to offer a few remarks on cinchona generally that have been suggested by the information they have collected.

The stock generally appears without doubt to be degenerating, and it therefore behoves cinchona growers to import, as far as lies in their power, seed from the native habitat of the tree.

Canker, which has so far proved incurable, undoubtedly is much more prevalent among the present stock than the original. Importation of fresh seed is looked upon by the Sub-Committee as the best remedy for it.

Shaving twice and then coppicing is, in the opinion of the Sub-Committee, the most profitable mode of harvesting the bark of the tree and the best means of prolonging the life of the stock; for by this treatment (namely, coppicing) the system of the plant is reinvigorated.

* From the *Weekly Ceylon Observer*, May 24.

GÉROMÉ CHEESE.*

The following is a description of the manufacture of a very popular cheese, known in France under the name of Géromé. It is largely consumed in Paris just as it is ripe, and it would be difficult to mention any cheese which is more delicious at this particular period. It is a soft round cheese varying in weight from 4 lbs. to 8 lbs., and is sometimes made with the addition of aniseed. It is made with milk at the temperature at which it comes from the cow, this being placed in a deep copper vat holding some forty-five quarts, when it is covered with a wooden lid, in the centre of which is inserted a wooden funnel resembling in form a cup. To the bottom of this is attached a cloth for straining. When this is not used a small disc is drawn over the hole. The rennet is immediately added, in quantity according to the weather and its strength. In half an hour the whey is divided from the curd with a ladle, and the vat recovered. In another half-hour the separation is continued, with the aid of a copper strainer 12 in. by 4 in. When the curd is divided into pieces about the size of a small nut it is taken out and placed in wooden cylindrical moulds, from 5 in. to 9 in. in diameter. Two moulds are used for each cheese, the one being fixed into the other, which is somewhat larger in diameter, and has a number of holes pierced in the bottom. The total height of the two when fixed is from 14 in. to 16 in. The curd entirely drains in this mould, and at the end of about twelve hours it will have sunk to about the height of the bottom and larger part of it, so that the top part can be taken off. The cheese is then placed in another mould of the same diameter as the bottom one, and put upon the shelf upside down. After six hours it is again turned, and this turning is continued twice daily for the two following days. In draining the whey the moulds are placed upon sloping shelves which are furnished with a rim at the edge, as in the Camembert cheese-rooms in Normandy. The whey runs off and is collected in a receptacle placed at the side of the table for the purpose. The temperature of the room in which this operation takes place should be from 59° to 64° Fahr. The next thing to be done is to salt the cheeses, which for this purpose are placed upon small boards made of beech and upon which layers of fine salt are sprinkled. The surface of the cheese must be well salted, and the operation repeated every three or four days, care being taken that it is turned each time. This turning is continued twice daily for three days after salting, and the surfaces of the cheeses each time are gently moistened with tepid water. When sufficiently dry on the crust they are removed to the drying-room, 30 grams of salt having been used in the salting process. In this *séchoir*, or drying-room, the cheese shelves are built one above the other, so that large numbers of cheeses can be kept in a small space and well cured, providing the temperature and aëration are complete. In summer the process of ripening is frequently conducted in the open air, the cheeses being protected with cloths to keep off flies and the sun; but during the other parts of the year a specially prepared room is invariably used. When thoroughly dry they are removed to the cave or cellar for the completion of the process, and here they are very carefully managed. This cave must be in good condition, with a draught of air passing through it; but if the temperature is too low the cheeses crack and lose quality. The time they remain here is determined by the season and the size of the cheese, the maker judging this for himself. The largest, however, are usually kept from three to four months. While in this compartment they are often turned, and washed with tepid water slightly salted, and daily examined to see whether they are ripening too rapidly. When they are brick-red in appearance and the surface sufficiently firm to yield to the pressure of the finger they are ready for market. A good Géromé is firm on the exterior, rich, and oily, and has a few small holes in the interior; while inferior makes, like inferior Gruyère, have numbers of large holes, are fragile, easily crumble, and sometimes become soft and pulpy when the whey has not been properly extracted from them.

* From the *Grocer*, July 5.

TASTELESS AND ODOURLESS SOLUTION OF AMMONIUM VALERATE.*

BY R. ROTHER.

The sharp, unpalatable flavour and repulsive odour of ammonium valerate have not greatly diminished it rather extensive application. This fact certainly indicates that the compound is possessed of some peculiar merit. Now, if by some simple and legitimate means, these objectionable features could be modified, a much higher degree of usefulness might be expected.

It has been customary to exhibit the salt in a slightly alkaline form of solution. Some elixirs of this salt are, however, to be found having a very decided acid reaction. Formerly, when solutions of ammonium valerate were prepared from valeric acid and ammonium carbonate, neutral and slightly alkaline solutions were, as a consequence, more in vogue than now. At present, the elixir is almost exclusively made from the crystallized salt. When these crystals are mixed with water, they form, to a large extent, an oily layer which floats on the surface of the mixture, but subsequently dissolves on the addition of the alcohol. In explanation of this result it has been stated that water decomposes the crystallized salt into valeric acid and free ammonia. To obviate this effect the salt was directed to be dissolved in the alcohol first, as then the subsequent admixture of water would not affect its decomposition. The truth, however, is that the crystals are in the main an acid valerate similar to the acid acetate of ammonium. When the acid valerate is mixed with a moderate amount of water, the normal salt dissolves, whilst the less soluble valeric acid rises to the surface. The addition of a requisite amount of ammonia dissolves the stratum of valeric acid, and thus all the salt is made normal and in permanent solution. Admixture of simple elixir, coloured or not, with this solution produces an elixir of the normal valerate uncontaminated by free valeric acid. A solution of the acid valerate fumes in the presence of gaseous ammonia, showing thereby that at ordinary temperatures the valeric acid volatilizes first. From this the writer concluded that the normal salt is not volatile, and that the obnoxious odour is due to the dissipation of free valeric acid. In order to find some expedient which could obviate this change in binding the incipient acid more firmly, a little borax was added to a slightly alkaline elixir of the valerate, coloured pretty deeply with simple tincture of cochineal. The immediate effect was a change of the colour to a light scarlet, indicating an acid reaction. More borax was then gradually added until this largely predominated, but the new tint remained unaffected. The sharp taste of the elixir had now entirely disappeared, and the repulsive odour was barely perceptible. In consideration of this result, crystallized ammonium valerate was mixed with four times its weight of water, then neutralized with ammonia, and the clear solution treated with borax by gradual addition. The borax was greedily absorbed, but after a certain amount of it had been added, a crystalline precipitate of a new salt began to form abundantly, even during the further incorporation of the borax. On diluting this mixture with twice its volume of water, it became clear immediately. The reaction of the mixture became acid after the first small addition of borax, and retained this condition even in the presence of excess of borax. After one molecule of borax had been consumed by two ms. of the ammonium valerate, the peculiar and unpleasant valeric odour had practically vanished, and the taste of the solution had wholly lost its sharpness and valeric character. It was now pleasantly sweet, with a tinge of saline. By spontaneous evaporation, tolerably large,

* From the *American Journal of Pharmacy*, June.

apparently octahedral, crystals were deposited, but when the solution was condensed by gently warming a different and more confused form of crystals appeared. All these crystals had a very mild saline taste, and yielded ammonia profusely on treatment with potash solution. These results indicate that sodium valerate, ammonium metaborate and free metaboric acid are formed.

This new form of valerate, aside from its pleasant flavour and odourless character, must also possess superior medicinal qualities. In the first place, the sodium valerate, by retaining the acid more firmly in combination, would seem to aid its absorption and consequent efficiency. In the second place, the ammonium metaborate simultaneously transmits and yields its base in a more prompt and effective manner. In the third place, the boric radicle is itself possessed of just such medicinal qualities as would render it a desirable adjunct. The palatable and acceptable nature of the solution dispenses with the usual adjuvants of the ordinary valerate, and hence the writer proposes a simple aqueous solution in place of the elixir and other forms. This solution, as above already stated, is practically odourless; that is, it is free from the persistent objectionable valeric rankness. This does not imply its being absolutely odourless, however. On drying along the walls of the containing vessel, as also around the mouths of the bottles, a very mild reminder of the former taint adheres, whilst in the body of the solution it cannot be perceived. Receptacles having contained the solution are readily and perfectly cleansed by simply rinsing with water. The older forms of the valerate were characterized by the nearly irremovable nature of the odour. The new solution represents about 2 grains of the normal ammonium valerate in the fluid drachm, and is prepared as follows:—

Ammonium valerate cryst. . . .	119 grains.
Borax	191 grains.
Water of ammonia,	
Distilled water, of each sufficient.	

Mix the valerate with one fluid ounce of distilled water, and add water of ammonia, drop by drop, until a clear and slightly alkaline solution is produced. Then add two fluid ounces of distilled water and the previously powdered borax, and when all has dissolved, excepting a few contaminating crystals of calcium borate, add distilled water to the measure of eight fluid ounces, and filter the solution.

CHEMICAL NATURE OF STARCH GRAINS.

Dr. Brukner has contributed to the 'Proceedings of the Vienna Academy of Sciences, a paper on the "Chemical Nature of the Different Varieties of Starch," especially in reference to the question whether the granulose of Nägeli, the soluble starch of Jessen, the amylodextrin of W. Nägeli, and the amidulin of Nasse, are the same or different substances.

A single experiment will serve to show that under certain conditions a soluble substance may be obtained from starch grains. If dried starch grains are rubbed between two glass plates, the grains will be seen under the microscope to be fissured, and if then wetted and filtered, the filtrate will be a perfectly clear liquid showing a strong starch reaction with iodine. Since no solution is obtained from uninjured grains, even after soaking for weeks in water, Brukner concludes that the outer layers of the starch grains form a membrane protecting the interior soluble layers from the action of the water. He was unable to detect any chemical differences between the amidulin of Nasse, the portion of the starch grain soluble in water, and the granulose of C. Nägeli, which he extracted by means of saliva. The soluble filtrate from starch paste also contains a substance identical with granulose. Between the two kinds of starch, the granular and that contained in paste, there is no chemical but only a physical difference, depending on the condition of aggregation of their micellæ.

W. Nägeli maintains that granulose or soluble starch differs from amylodextrin in the former being precipitated by tannic acid and acetate of lead, while the latter is not. Brukner fails to confirm this difference, obtaining a voluminous precipitate with tannic acid and acetate of lead in the case of both substances. Another difference maintained by Nägeli, that freshly precipitated starch is insoluble, amylodextrin soluble in water, is also contested; the author finding that granulose is soluble to a considerable extent in water, not only immediately after precipitation, but when it has remained for twenty-four hours under absolute alcohol. Other differences pointed out by W. Nägeli, Brukner also maintains to be non-existent, and he regards amidulin and amylodextrin as identical.

Brücke gave the name erythrogranulose to a substance nearly related to granulose, but with a stronger affinity for iodine, and receiving from it not a blue but a red colour. Brukner regards the red colour as resulting from a mixture of erythrodextrin, and the greater solubility of this substance in water. If a mixture of filtered potato-starch paste and erythrodextrin is dried on a watch-glass, covered with a thin pellicle of collodion, and a drop of iodine solution placed on the latter, it penetrates very slowly through the pellicle, the dextrin becoming first tinctured with red, and the granulose afterwards with blue. If, on the other hand, no erythrodextrin is used, the diffusion of the iodine causes at once simply a blue colouring.

With regard to the iodine reaction of starch, Brukner contests Sachsse's view as to the loss of colour of iodide of starch at a high temperature. He shows that the iodide may resist heat, and that the loss of colour depends on the greater attraction of water for iodine as compared with starch, and the greater solubility of iodine in water at high temperatures.

The different kinds of starch do not take the same tint with the same quantity of (solid) iodine. That from the potato and *Arum* gives a blue, that from wheat and rice a violet tint; while the filtrate from starch paste, from whatever source, always gives a blue colour.

PATENT MEDICINE STATISTICS.

AN ACCOUNT *showing* (1) *the* NUMBER *of* PATENT MEDICINE VENDORS' LICENCES *issued, with the* DUTY *thereon; and* (2) *the* NUMBER *of* PATENT MEDICINE LABELS *issued, with the* DUTY *thereon, in* GREAT BRITAIN, *in each of the years from* 1864-65 *to* 1883-84, *both inclusive.**

Rates of Licence Duty,	Year ended 31st March.	Great Britain. Patent Medicine Vendors. Number of Licences issued.	Great Britain. Patent Medicine Vendors. Amount of Duty charged	Great Britain. Patent Medicine Labels. Number of Labels issued.	Great Britain. Patent Medicine Labels. Amount of Duty charged
		No.	£	No.	£
In London and Edinburgh - - - 2*l.*	1865	10,922	6,125	7,074,668	55,333
Other Cities, Boroughs, or Towns Corporate in Great Britain 10*s.*	1866	11,520	6,386	7,569,033	59,894
Elsewhere in Great Britain - - - 5*s.*	1867	11,792	6,570	8,007,945	62,250
	1868	11,963	6,650	8,074,273	62,556
	1869	12,271	6,842	8,663,685	66,860
	1870	12,339	6,879	9,543,140	72,353
	1871	12,619	7,018	9,426,272	71,343
	1872	12,854	7,139	11,578,455	86,517
	1873	13,185	7,284	12,731,753	95,813
	1874	13,380	7,379	13,085,835	99,808
	1875	13,783	7,553	14,824,173	114,323
	1876	15,022	8,798	15,873,934	123,136
	1877	15,823	3,956	15,181,730	118,222
	1878	16,703	4,176	15,702,051	125,142
	1879	19,008	4,752	16,727,669	132,386
	1880	19,116	4,779	16,627,131	135,366
	1881	18,754	4,688	17,198,442	139,763
	1882	18,765	4,691	17,479,678	145,266
	1883	19,404	4,851	18,457,990	154,774
	1884	19,921	4,980	19,006,328	159,238

* From the Annual Report of the Inland Revenue Commissioners.

THE POSITION OF PHARMACISTS IN RELATION TO THE PHARMACOPŒIA.

The following is a complete list, taken from the Official Report, of the petitions, together with the number of signatures to each, presented in the House of Commons between the 2nd and the 8th of July inclusive, in favour of an alteration of the Medical Bill in the direction desired by the Council of the Pharmaceutical Society:—

July 2.

	Seal.
Senatus Academicus of the University of Edinburgh, in meeting assembled; A. Grant, Principal (*Sir Lyon Playfair*)	1

July 3.

	Signatures.
Medical Practitioners of Peterborough (*Mr. Sydney Buxton*)	5
— Lancaster (*Colonel Stanley*)	6
Chemists and Druggists of Peterborough (*Mr. Sydney Buxton*)	17
— Leek (*Mr. H. T. Davenport*)	5
— Leominster (*Mr. Rankin*)	6
— Lancaster (*Colonel Stanley*)	11

July 4.

Medical Practitioners resident at Ryde (*Mr. Ashley*)	6
— Montrose (*Mr. Baxter*)	5
— Forfar (*Mr. Baxter*)	5
— West Bromwich (*Mr. Brogden*)	9
— Banbury (*Mr. Cartwright*)...	7
— Wigan (*Mr. Algernon Egerton*)	7
— Merthyr Tydvil (*Mr. Charles James*)	7
— Staleybridge (*Mr. Summers*)	5
— Middlesborough (*Mr. Isaac Wilson*)	8
Members of the Pharmaceutical Society resident at Ryde (*Mr. Ashley*)	11
— Montrose (*Mr. Baxter*)	6
— Forfar (*Mr. Baxter*)	3
— West Bromwich (*Mr. Brogden*)	12
— Edinburgh (*Mr. Buchanan*)	70
— Edinburgh (*Mr. Buchanan*)	33
— Banbury (*Mr. Cartwright*)...	6
— Dorking (*Mr. Cubitt*)	3
— London (*Mr. Firth*)	18
— Worcester (*Mr. Rowley Hill*)	18
— Stockport (*Mr. Hopwood*)	22
— Merthyr Tydvil (*Mr. Charles James*)	7
— Torquay (*Sir John Kennaway*)	14
— Rochdale (*Mr. Potter*)	13
— London (*Mr. William Henry Smith*)	18
— London (*Mr. William Henry Smith*)	37
— Staleybridge (*Mr. Summers*)	5
— Middlesborough (*Mr. Isaac Wilson*)	11

July 7.

Medical Practitioners of Stirling (*Mr. Campbell-Bannerman*)	8
— Ludlow (*Colonel Windsor Clive*)	6
Charles Rothwell, M.R.C.S.E., and others (*Mr. Cross*)	9
Medical Practitioners of Windsor (*Mr. Gardner*) ...	10
— Holywell (*Lord Richard Grosvenor*)	4
— Durham (*Sir Farrer Herschell*)	2
— Birkenhead (*Mr. MacIver*)	11
— Inverness (*Mr. Mackintosh*)	6
— Ipswich (*Mr. West*)	4
— Leamington (*Sir Eardley Wilmot*)	11
— Cockermouth	3
— Dunfermline	5
Chemists and Druggists of Dundee (*Mr. Armitstead*)	12
— Scarborough (*Mr. Caine*)	23
— Stirling (*Mr. Campbell-Bannerman*)	5
— Ludlow (*Colonel Windsor Clive*)	5
— Bolton (*Mr. Cross*)	15
— Greenwich (*Baron Henry de Worms*)	12

	Signatures.
Chemists and Druggists of Wandsworth (*Mr. Ellis*)	6
— Windsor and Eton (*Mr. Gardner*)	11
— Chatham (*Mr. Gorst*)	12
— Holywell (*Lord Richard Grosvenor*)	2
— Poole (*Mr. Harris*)...	7
— Durham (*Sir Farrer Herschell*)	13
— Birkenhead (*Mr. MacIver*)	24
— Wakefield (*Mr. Mackie*)	16
— Inverness (*Mr. Mackintosh*)	6
— Grantham (*Mr. Mellor*)	13
— Gloucester (*Mr. Monk*)	22
— Newport, in the county of Monmouth (*Mr. Frederic Morgan*)	—
— Hull (*Mr. Norwood*)	70
— Kensington and Districts (*Lord Algernon Percy*)	22
— Ipswich (*Mr. West*)	16
— Leamington (*Sir Eardley Wilmot*)	21
— Dunfermline	6
— Harwich	3
— Oldham	35

July 8.

	Seals.
Royal College of Surgeons of Edinburgh, under their Corporate Seal (*Mr. Ramsay*)	1
Physicians and Surgeons of Glasgow (*Mr. James Campbell*)	1
	Signatures.
Members of the Forfarshire Medical Association, in meeting assembled; J. W. Miller, President; Robert Sinclair, Secretary (*Mr. Barclay*) ...	2
— (*Mr. Barclay*)	2
Medical Practitioners of Deal (*Mr. Brassey*) ...	6
— Stamford (*Mr. Buszard*)	3
— Neath (*Mr. Dillwyn*)	6
— Canterbury (*Mr. Akers-Douglas*)	5
— Salisbury (*Mr. Passmore Edwards*)	3
— Belper (*Mr. Evans*)	5
— Helensburgh (*Mr. Ewing*)	7
— Kilburn (*Lord George Hamilton*)	9
— Leicester (*Mr. M'Arthur*)	9
— Ruthin and Corwen (*Mr. Osborne Morgan*) ...	8
— East London (*Mr. Ritchie*)	10
— Chester (*Mr. Wilbraham Tollemache*)	12
— of Saint Thomas's Hospital, London (*Mr. Torrens*)	6
— Liverpool (*Mr. Whitley*)	3
— Liverpool (*Mr. Whitley*)	32
Pharmaceutical Chemists and Chemists and Druggists of Ventnor (*Mr. Ashley*)	6
— Deal and Walmer (*Mr. Brassey*)	7
— Stamford (*Mr. Buszard*)	7
— Uttoxeter (*Mr. Davenport*) [App. 344]	7
— Neath (*Mr. Dillwyn*)	8
— Newcastle-under-Lyme (*Mr. Donaldson-Hudson*)	5
— Canterbury (*Mr. Akers-Douglas*)	10
— Wigan (*Mr. Eckersley*)	7
— Salisbury (*Mr. Passmore Edwards*)	9
— Belper (*Mr. Evans*)...	5
— Helensburgh (*Mr. Ewing*)...	5
— Leeds (*Mr. Herbert Gladstone*)	21
— Leith (*Mr. Andrew Grant*)	23
— Kilburn (*Lord George Hamilton*)	25
— Saint Ives, in the county of Cornwall (*Mr. Kennard*)	3
— Ruthin (*Mr. Osborne Morgan*)	8
— London (*Mr. William Nicholson*)	36
— London (*Lord Algernon Percy*)	42
— Devonport (*Mr. Puleston*)	13
— Devonport (*Mr. Puleston*)	7
— East London (*Mr. Ritchie*)	7
— Chester (*Mr. Wilbraham Tollemache*)	20
— London (*Mr. Torrens*)	33
— Liverpool (*Mr. Whitley*)	102
— Liverpool (*Mr. Whitley*)	34
— Leicester	38

The Pharmaceutical Journal.

SATURDAY, JULY 26, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

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ANNUAL REPORT OF THE INLAND REVENUE COMMISSIONERS.

THE Twenty-Seventh Annual Report of the Commissioners of Her Majesty's Inland Revenue, for the financial year ending on the 31st of March last, has just been issued, and like most of its predecessors it contains references to a number of subjects of special interest to readers of this Journal. One of the features in it most noticeable from this point of view is the unusual prominence given to the subject of the revenue derived from the traffic in patent medicines by the publication, as an appendix, of a special table showing the number of patent medicine vendors' licences issued in Great Britain, with the duty paid thereon, and the number of patent medicine labels, with the duty paid on them, in each of the last twenty years. From this table, which is printed on another page, it appears that in the number of licences issued, 19,921, the number of labels issued, 19,006,328, and the amount of duty charged, £159,238, the figures for last year are higher than for any of the previous twenty years. In fact, with the exception of the revenue derived from the vendors' licences, which has been permanently affected by the reduction of the duty in 1876 to the uniform sum of 5*s.*, the increase under each head, year by year, has been almost uninterrupted; last year the number of the licences issued was nearly twice as many as in 1865, whilst the number of labels issued and the amount of duty charged upon them have nearly trebled in the same interval. It would seem to be a not improbable assumption to connect the publication of these statistics with considerations affecting the Sale of Poisons Bill that has been occupying the attention of the Government, and which is supposed to be now ready for introduction into Parliament at the first opportune moment; for it is generally recognized by those who have studied the subject that in the drawing up of a Sale of Poisons Bill which shall be satisfactory under present conditions the clauses relating to patent medicines containing poisons will prove to be one of the most difficult parts of the problem. There can be no doubt of the existence of a general consensus of public opinion as to the necessity for an alteration of the existing law in this respect, and the medical journals have during the last week or two been discoursing at considerable length on other modifications that they consider to be required in the Patent Medicines Act. Considering therefore the trumpery nature of this law as a source of revenue, and the very grave doubt that exists as to its beneficial effect upon the moral and physical health of the community, the question arises whether the best form of modification to which the Act could be submitted might not be its total repeal. The gross revenue collected under the provisions of the Act only amounted last year to £164,218, a sum which is evidently reducible to a considerable extent by the charges incurred in the collection, so that it would be ridiculous to contend that such a tax should be maintained at the cost of much public inconvenience. On the other hand, it is not quite clear what worthy motive the patent medicine dealers as a body can have for desiring to continue to pay the tax, or what claim they have to be allowed to sell medical preparations except under the conditions that apply to the ordinary retailing of medicines by the registered chemist and druggist.

Another appendix is occupied with the usual report of the Principal of the Laboratory in connection with the Inland Revenue Department, from which it appears that the number of samples examined during last year was 26,550, showing an increase of upwards of two thousand as compared with the previous year, and being in excess of the number examined in any former twelve months. Much of this increase has been due to the examination of extra samples of "wort," for the purpose of checking the declarations made by brewers using other saccharine materials than those derived from malt. Tobacco is another subject to which much attention has been given, and an exhaustive investigation is reported to be in progress on the organic and inorganic constituents of upwards of a score of different kinds, with a view of throwing more light upon the composition of the varieties met with in commerce. The samples referred by magistrates to the laboratory, under the Sale of Food and Drugs Act, numbered fifty-one, against thirty in the previous year, and included milk, butter, bread, coffee, mustard, ginger, oatmeal, rum, whisky, tincture of quinine and carbonate of magnesia. In exactly two-thirds of these cases the chemists of the Department agreed with the conclusions arrived at by the public analysts, and in the other third they were unable to confirm them. The charges of adding water to milk appear to have been productive of about the lowest proportion of disagreement—six out of twenty-eight; but in two out of five cases where the offence charged was the abstraction of cream the referees reported adversely to the public analyst. It is perhaps indicative of the need that exists for increased attention being paid to work with the microscope, that out of seven cases in which this instrument was the principal means available for

the detection of adulteration, in three—a sample of coffee said to be adulterated with chicory, and two samples of mustard alleged to contain 12 per cent. of wheat flour—conclusions were arrived at different from those of the public analyst. Among the other articles specified, a sample of butter, said to consist mostly of foreign fat, was found to be genuine, and a sample of bread alleged to contain alum was found to be free from that substance. The instances quoted, however, in which we are most interested, are one of "magnesia" and another of "tincture of quinine." In the case of the "magnesia" the public analyst had reported that the sample consisted of about two-thirds carbonate and one-third oxide of magnesia, a statement that was practically confirmed on the fresh analysis. In addition, the public analyst had expressed an opinion that the sample ought not to have been sold for "light magnesia," as its effects as a medicine were different. But the Principal of the Inland Revenue Laboratory, in giving his certificate, considered it proper to call the attention of the justices to the synonyms of carbonate of magnesia and magnesia, and the similarity of the physiological effects ascribed to those compounds by various accepted authorities. The "tincture of quinine" case alluded to is probably one that was reported in this Journal about twelve months since. In this instance, a public analyst had reported that a sample of tincture of quinine contained sulphate of quinine only in the proportion of 6·2 grains in the ounce, instead of 8 grains as required by the British Pharmacopœia. At the hearing of the case, however, a witness on behalf of the defendant deposed that he had obtained from the portion of the sample left with the seller, quinine sulphate in the proportion of 7·44 grains to the ounce, and that about equal to another half a grain had been lost in the analysis. The third portion was, therefore, referred to the chemists at Somerset House, who found it to contain the full proportion of sulphate of quinine, eight grains to the ounce. We think, it must be admitted that these cases give fresh proof, if it were wanted, of the wisdom of the Legislature in providing unprejudiced assessors to advise magistrates in conflicts of evidence given by experts.

Among the other work done in the Inland Revenue Laboratory has been the examination of a large number of samples for the various Government departments, as a check upon the quality of goods supplied under contract, and it is noticeable that a very considerable proportion are adversely reported upon. For instance, an improvement in the samples of lime and lemon juice examined for the Board of Trade, noticed in the previous year, has not been maintained. It was consequently found necessary to reject 13 per cent. of the lemon juice samples, representing 7935 gallons, and 6 per cent. of the lime juice, representing 1325 gallons, as not complying with the requirements of the Board. Special attention has also been directed to the character of the enamel linings of cooking utensils, and many specimens of such articles have been examined at the request of the Admiralty. The results of the analyses showed the necessity for the examination, for many of the enamels were found to contain dangerous quantities of lead and arsenic, so that most of the utensils could not, with safety, be recommended for use. On the other hand, a few samples demonstrated that it is practicable to prepare an enamel and glaze free from hurtful substances. We think the foregoing will be sufficient evidence of the multifarious duties performed by the chemists in the Inland Revenue Laboratory and indicate the useful part they take in the public service.

On another page will be found a list, taken from the official reports, of the petitions presented to Parliament, up to and inclusive of July 8, in favour of the amendment of the Medical Acts Amendment Bill so as to provide for the direct representation of pharmacists upon the Pharmacopœia Committee. As this list does not include any petitions presented within the last fortnight it is evidently far from complete, but it is sufficiently so to show a gratifying endorsement by the medical profession of the position taken by pharmacists upon this question. Unfortunately there does not seem to be much likelihood that the question will be discussed in the present session of Parliament, for although the Bill is set down for Committee on Monday next, there is much probability that it will have to be abandoned. Should this be the case, however, we hope that this weighty expression of medical and pharmaceutical opinion will be taken into consideration by the Government, and that the required alteration will be made in the Bill before it is reintroduced into Parliament.

* * *

An official programme, subject to revision, has been issued of the classification that will be adopted in the International Inventions Exhibition, which is to be held at South Kensington next year. From it we learn that there will be two main divisions, the first being devoted to "apparatus, appliances, processes and products invented or brought into use since 1862;" and the second to musical instruments and apparatus. In order, apparently, to secure the character of novelty for this exhibition it has been decided not to entertain, save under exceptional circumstances, applications for space for any objects which have been shown in the Smoke Abatement Exhibition, 1881, the Fisheries Exhibition of last year, or the Health Exhibition of this year, or for agricultural implements. Division I. will be divided into thirty-one groups, and among these are several that will include articles of considerable interest to our readers. Group XIII., Electricity, will include generators, conductors, testing and measuring apparatus, inventions relating to telegraphy and telephony, electric lighting, electro-metallurgy and electro-chemistry, the distribution and utilization of power, and electro-medical apparatus. Group XIV. will illustrate apparatus, processes and appliances connected with applied chemistry and physics. Group XV. will be devoted to inventions connected with the manufacture and use of gas and other illuminants. Group XVII., "Food Cookery

and Stimulants," will include among other inventions those relating to the preservation of food, brewing, distilling and wine-making, the manufacture of aërated water, and the preparation of tea, coffee, etc., as beverages. Group XXVIII. will be devoted to philosophical instruments and apparatus of various kinds. Applications for space are to be made, not later than the 15th of September next, to Mr. Edward Cunliffe Owen, South Kensington.

* * *

The *Canadian Pharmaceutical Journal* mentions a case of poisoning that has happened in York county consequent upon an apprentice supplying a quantity of yellow jasmine in the place of rue, saying it was the same thing under a different name. An infusion prepared from the yellow jasmine was taken by a lady and caused death in about twenty minutes. A coroner's jury having returned a verdict that the apprentice had not exercised due caution in the discharge of his duty, he was arrested and committed for trial on a charge of manslaughter.

* * *

Another case of poisoning in Canada is reported to have occurred in Belleville, and was due to the introduction of oxalic acid in the place of tartaric acid by some amateurs in the art of preparing "lemonade." The product is said to have been at first pronounced excellent, but this opinion soon underwent modification, and the most serious consequences were only avoided by prompt medical aid and the vigorous use of the stomach pump.

* * *

The Dominion Legislature has passed an Adulteration Act for Canada which was to come in force on the first of the present month. In it "food" is defined as including every article used for food or drink by man, and "drug" as comprising all medicines for internal or external use. According to the new Act it will be unlawful to sell or expose for sale any "drug" under a name that is official in the British or United States Pharmacopœia, if it does not conform to the standard of strength, quality and purity therein laid down; while if the "drug" is sold or exposed for sale under a name not included in the above pharmacopœias, but found in "some other generally recognized pharmacopœia or other standard work on materia medica," it must answer to the characters there given. The definitions, however, are not to apply when any extraneous matter becomes unavoidably introduced in a process of collection or preparation, or when a substance not injurious to health is added for the purpose of making the drug fit for consumption, commerce or transport, and not to increase the bulk or weight, or to conceal inferior quality, provided, however, that such an admixture is notified on a label attached to the drug.

* * *

It is announced that in future candidates for graduation at the New York College of Pharmacy will be required to pass a preliminary examination, covering a correct use of the English language and a knowledge of such branches of a common school education as is equivalent to the general standard adopted by grammar schools. Commenting approvingly upon the propriety of this course, as worthy of imitation by other similar institutions, a New York contemporary remarks that "the wonder is that a majority of these colleges have not earlier seen the necessity of sending out fewer graduates and better pharmacists."

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July, 1884.

Present on the 9th, 10th, 11th, 15th, 17th and 18th—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Southall, Symons, Tanner, Taylor and Thresh.

Present on the 16th—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Linford, Plowman, Southall, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow attended on the 11th, 15th and 17th, on behalf of the Privy Council.

MAJOR EXAMINATION.

9*th.*—*Seven* candidates were examined. *Four* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Arnott, Daniel .....Pontypridd.
Clower, John.....Nottingham.
Gradidge, James Henry .....Truro.

10*th.*—*Eight* candidates were examined. *Three* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Eastes, Ernest John.....Deal.
Hanson, Christopher .....Buckhurst Hill.
McDiarmid, Fraser .....Deal.
Pierce, Robert Wynne Chas. ...Bangor.
Smith, Samuel Henry .....Leamington.

15*th.*—*Seven* candidates were examined. *Two* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Callaway, George Frederic.....Ipswich.
Nicholls, Reginald Edward.....Lee.
Reynolds, Richard Freshfield...Leeds.
Salmon, Ernest Frederick .....London.
Wilkinson, Robert .....Kirkham.

MINOR EXAMINATION.

9*th.*—*Twenty-one* candidates were examined. *Thirteen* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Adams, Joseph.....Bristol.
Aston, Alfred Valentine ....Tarporley.
Banks, Alfred .....Stratford-on-Avon.
Barker, William .....Grimsby.
Barrass, Thomas Edward .....Peterborough.
Bayley, Edward George .....Rye.
Brooke, Thomas Noden .....Retford.
Rookledge, Frederick ... .Easingwold.

10*th.*—*Twenty-two* candidates were examined. *Eighteen* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Butler, Benjamin Herridge.....Sidcup.
Clark, Thomas James .. ..London.
Coleman, Edmund Francis .....Wolverhampton.
Cripps, Richard Augustus .....Upper Holloway.

11*th.*—*Twenty-seven* candidates were examined. *Sixteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Elliott, Horace Herbert .....Stowmarket.
Ellis, Clement .....Tunbridge Wells.
Fisher, George .....Wigton.
Flower, Walter.....Barton-on-Humber.
Freeman, Frederick William ...St. Albans.
Gibbons, Alfred John .....London.

Glanville, Henry Charles.....London.
Godsland, Wm. Hy. Baker.....London.
Gray, Alfred Francis .....Leicester.
Hall, Ernest Edward ....Wednesbury.
Harris, George .....Moseley.

15*th.*—*Twenty-one* candidates were examined. *Eleven* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists: —

Fisher, Isaac .....Liverpool.
Holme, William Assheton .....Northampton.
Huggins, Samuel .....Barnet.
Hughes, John .....Aberystwith.
Hulland, James.....Bath.
Ingham, William Linnell.....London.
Irving, Frederick William .....Donington.
Jaques, George .....Leeds.
Joint, Francis.....Barnstaple.
Lewis, Rees Martin .....Cheltenham.

16*th.*—*Twenty-nine* candidates were examined. *Twenty-one* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Kingan, David .....Dumfries.
Lovely, Charles Newton .....Ipswich.
Moor, George ....Grantham.
Morrison, Charles Orr.....Sheffield.
Neale, George .....Spilsby.
Parker, Henry George... .....Kettering.
Peacock, George .....Heslerton.
Williams, Alfred Griffiths .....Hereford.

17*th.*—*Twenty-six* candidates were examined. *Eighteen* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jones, John Kinsey.....Llanidloes.
Rushton, William .....London.
Smith, Frederic Harcourt .....Walworth.
Sturdy, John Robert .....Lincoln.
Sumner, William .....Coleshill.
Taylor, Henry Pearson .....Alnwick.
Timm, Edmund .....Goole.
Watson, John Winder.....Tunstall.

18*th.*—*Twenty-eight* candidates were examined. *Seventeen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Dodd, Richard Jefferson.....Sunderland.
Hemstead, Alfred Joseph .....Rochester.
James, Morgan William.....Llandovery.
Sanders, Francis Theodore.....Ramsgate.
Stevens, Arthur .....London.
Taylor, Thomas Ernest .....London.
Ward, Robert Edward .....Kettering.
Webster, Edward. .....Hull.
Withers, Herbert Percival .....Penwortham.
Wyatt, Harold .....Bootle.
Young, Herbert Edward.....Binfield.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's examination:—

Certificate of the College of Preceptors.

Dixon, James .....Buxton.

Certificates of the University of Cambridge.

Bonner, Clifford Goodwin .....Berechurch.
Masters, Henry .....Buxton.
Peck, Herbert John.....Cambridge.

Certificate of the University of Glasgow.

Farmer, John .....Glasgow.

Certificates of the University of Oxford.

Marshall, Robert James ....Boston.
Watkins, Charles Herbert .....Nailsworth.

The Report o the College of Preceptors on the Preliminary Examination held on July 8th was received.

Three hundred and twenty-five candidates had presented themselves for examination, of whom *one hundred and fifty-nine* had failed. The following *one hundred and sixty-six* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Addison, Charles Samuel .....Hitchin.
Aitcheson, William Drysdale...Berwick.
Aldrich, Frank Gladstone .....Diss.
Avigdor, Frank.....Bradley.
Baker, William Charles .....Edinburgh.
Banks, Hervey Lowndes.....Stockport.
Barlow, Alfred Henry.....Gee Cross.
Barnes, Colin Miller .....Sunderland.
Bartlett, Thomas William .....Landport.
Bell, William Edward .....Bootle.
Bennett, David..... .....Edinburgh.
Birkett, William ..... Morecambe.
Breese, Richard George .....Merthyr Tydvil.
Broadbent, Harry.....Halifax.
Broughton, Edgar Goldthorpe Brighouse.
Bruce, James ....Glasgow.
Buckley, Herbert .....Stalybridge.
Burns, Alexander.....Newcastle-on-Tyne.
Butchart, Robert .....Edinburgh.
Button, Arthur Edward .....Lincoln.
Castell, Ernest Henry.....Daventry.
Chambers, John .....Wisbeach.
Clark, John Jeffery.....Sevenoaks.
Clark, William Geo. Johnson Leicester.
Clarke, Arthur Bertram .....Coventry.
Clayton, William.....Knutsford.
Colwill, Richard ... .North Petherwyn.
Cook, Robert ....Thornhill.
Couve, Noël .....London.
Cox, Herbert Victor .....Southampton.
Curtis, Michael.....Malvern Link.
Davidson, James ..... Gateshead-on-Tyne.
Davies, Evan Francis .....Llanybyther.
Davies, Richard Llewelyn .....Pontardawe.
Davis, Walter Frederick.....Cotham.
Dibble, Ernest Clement .....Sheffield.
Dodgson, Tom Roper .....Ulverston.
Donald, James Jameson .....Newscone.
Dumble, William.....Probus.
Dunger, George William.....Norwich.
Elder, Alexander .....Edinburgh.
Emery, Joseph Henry ....Upper Sydenham.
England, Herbert .....Horbury.
Evans, Moses Thomas.....Llanelly.
Farman, Robert James .....Ely.
Filmer, John Honeywood, jun. Devonport.
Ford, Thomas Mills.....Romsey.
Francis, John .....Llandilo.
Geen, Charles Alfred .....Exeter.
Gill, John William .....Guiseley.
Glasspool, Herbert George .....Landport.
Goodman, Josiah .....London.
Gooseman, Henry Charles .....Hull.
Graham, David.....Glasgow.
Green, Ralph Milburn. .....London.
Green, Robert Henry .....Newton Stewart.
Greening, Geo. Fredc. Gregory. Dorchester.
Grice,, Joseph Ed. Brindley.....Brighton.
Grieve, James .....Hawick.
Griffin, James Frederick.....Birmingham.
Hall, Harry ....Bury.
Harding, Henry Jas. Cooper ...Sudbury.
Harkness, James Baird .....Bridgwater,
Harrington, William.....St. Bees.
Hawthorne, Archibald... .....Stafford.
Hawtin, William Grist .....London.
Hill, William Henry .....Wolverhampton.
Holmes, Bryan.....Bentham.

Howard, Arthur .....Ely.
Howe, Edward.....Stoke-on-Trent.
Hull, John William.....Tamworth.
Hunter, Archibald Geo. CrosbieLeeds.
Hurst, Richard Proudman .....Ramsbottom.
Iley, John Thomas .....Old Shildon.
Inglis, Henry .....Kirriemuir.
Inkster, Hedley Peter Claude...London.
Jack, James .....Cullen.
Jenkins, William Alphons .....Nantwich.
John, Howell Walter .....Pontardawe.
Johns, Thomas .....Woolwich.
Johnson, Herbert Mellor .....Great Malvern.
Jones, Joshua .....Newcastle Emlyn.
Kempton, Ernest Arthur .....Ely.
Kemsley, Thomas David.....Montrose.
Knight, Peter .....Aberdeen.
Laidlaw, John .....Hawick.
Landale, George .....Edinburgh.
Lees, John Edward .....Stalybridge.
Lewis, Richard George .....Brecon.
Leys, Alexander .....Banchory Ternan.
Llewellyn, George Parry.....St. Clears.
Lighbody, Robert.....Edinburgh.
Longhurst, Ernest Thomas.....Shrewsbury.
Lyon, William .....Keith.
McHugh, Arthur Henry.....Castleford.
McKenna, Fergus .....Girvan.
McRae, James F.....Helensburgh.
Macaulay, Edwin Archibald ...Pontefract.
Macnamara, Thomas .....Edinburgh.
Marrett, Charles Ayton .....Peterborough.
Marshall, Richard Harrison ...Bradford.
Marten, Albert Goodliffe .....Luton.
Mason, Robert .....Paisley.
Maughan, Edward .....Coundon.
Meadway, Ernest George .....London.
Merrett, Edward Lionel .....Romsey.
Morgans, Owen Jones.....Dwyran.
Myers, James ....Tadcaster.
Nash, John Arthur Hylton ...London.
Neve, Mary Elizabeth Beck ...Eastbourne.
Neville, Egbert.....Banbury.
Nicholson, Allan Macdonald ...Creetown, N.B.
Overton, Robert Sims .....East Dereham.
Owen, John ....Holyhead.
Parsons, Ernest Alsager.....Wolston.
Partridge, Charles Henry .....Clifton.
Patrick, James.....Dunfermline.
Paul, Henry Stanley .....Birmingham.
Peake, Harry Edward.....Stamford.
Pearson, George Edward.....Northallerton.
Pierson, Herbert Sidney.....London.
Petrie, Jamas .....Dundee.
Porritt, Frank .....Mirfield.
Postlethwaite, Thomas .....Kirkby-in-Furness.
Priestley, Lawrence.....Nottingham.
Procter, Benjamin Bake .....Scarborough.
Ralph, William.....Nairn.
Ramsbotham, Joseph .....Southport.
Rawson, Richard .....Newark-on-Trent.
Reid, James .....Aberdeen.
Reid, Sidney Thomas .....Normanton.
Richards, Thomas Henry .....Shebbear.
Richardson, W. N. Saunders ...Warminster.
Riley, Alfred Thomas .....London.
Ritson, Eldred .....Workington.
Roberts, John Rowlands.....Bodedern.
Sharp, William Ashton .....Owston Ferry.
Shellcross, Robert Herbert.....Bolton.
Simpson, Peter.....Rothes.
Smart, James .....Edinburgh.
Smith, Albert .....Royston.
Smith, Richard Silcock .....Norwich.
Statham, Richard Twemlow ...Llanfairfechan.
Stead, William Wilkinson .....Bradford.
Stewart, Henry George Wales..New Barnet.
Symons, William .....Stoke.
Taylor, Horace Dugdale .....Stamford.
Taylor, William Findlay ...Spittalfield-by-Dunkeld.
Thomas, John Shadrach .....Llanerchymedd.
Thompson, Frederick .....Harrogate.
Travis, Henry Arnold.....Manchester.
Troughton, Reginald .....Edinburgh.
Turner, Walter Reginald .....Hazel Grove.
Tweedy, John Henry .....Northwich.
Tyrell, Charles .....Southampton.
U'Ren, William Condy .....Liskeard.
Ward, Walter James .....Headingly.
Watson, James Rutherford.....Lauder.
Whittle, George, jun. .....London.
Williams, George James.....Fishguard.
Williams, Joseph Richard .....Penmaenmawr.
Williams, William Morris .....Penmaenmawr.
Willis, John .....Douglas.
Wilson, Charles Henry .....Stockton-on-Tees.
Wolstenholme, Austin Whiley..York.
Yarwood, Thomas .....Bury.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	11	6	5	Lancaster	7	4	3
Birmingham	18	7	11	Leeds	21	14	7
Brighton	4	2	2	Lincoln	6	2	4
Bristol	7	4	3	Liverpool	12	3	9
Cambridge	8	6	2	London	38	16	22
Canterbury	2	0	2	Manchester	23	13	10
Cardiff	5	1	4	Newcastle-on-T.	9	5	4
Carlisle	4	2	2	Northampton	4	1	3
Carmarthen	10	8	2	Norwich	5	4	1
Carnarvon	10	7	3	Nottingham	9	3	6
Cheltenham	1	1	0	Oxford	1	1	0
Darlington	7	3	4	Peterborough	5	4	1
Douglas	1	1	0	Sheffield	3	1	2
Dundee	10	4	6	Shrewsbury	4	1	3
Edinburgh	24	15	9	Southampton	14	7	7
Exeter	10	4	6	Truro	2	2	0
Glasgow	11	7	4	Worcester	4	2	2
Hull	3	1	2	York	9	3	6
Inverness	3	1	2				

The questions set for examination were as follows:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. Translate into English either A. (Cæsar) or B. (Virgil).

(*The Candidate must not attempt both.*)

A. CÆSAR.

1. Interea ea legione, quam secum habebat, militibusque, qui ex provincia convenerant, a lacu Lemanno, qui in flumen Rhodanum *influit*, ad montem Juram, qui fines Sequanorum ab Helvetiis dividit, milia passuum decem novem murum, in altitudinem pedum sedecim, fossamque perducit. Eo opere perfecto, praesidia *disponit*, castella communit, quo facilius, si se invito transire conarentur, prohibere *possit*.

2. Caesar, primum suo, deinde omnium ex conspectu remotis equis, ut aequato omnium periculo spem fugae *tolleret*, cohortatus suos, proelium commisit. Milites, e loco superiore pilis missis, facile hostium phalangem *perfregerunt*. Ea disjecta, gladiis destrictis, in eos impetum fecerunt. Gallis magno ad pugnam erat impedimento, quod, pluribus eorum scutis uno ictu pilorum transfixis et colligatis, quum ferrum se *inflexisset*, neque evellere, neque, sinistra impedita, satis commode pug nare poterant.

II. Grammatical Questions.

(*For those Candidates who take Cæsar.*)

1. Decline in full, and give the gender of *legione, opere, equis, ictu.*

2. Give the first person singular of the present and perfect indicative, and also the supine and infinitive of the verbs in italics.

3. In what cases are the following words (par. 2), and why:—*periculo, suos, impedimento, se*?

4. What are *deponent* verbs and *impersonal* verbs? Give three examples of each.

B. Virgil.

I. Translate into English:—

1. Urbs antiqua fuit—Tyrii tenuere coloni—
Carthago, Italiam contra Tiberinaque longe
Ostia, dives opum, studiisque asperrima belli;
Quam Juno fertur terris magis omnibus unam
Posthabita coluisse Samo. Hic illius arma,
Hic currus fuit: hoc regnum Dea gentibus esse,
Si qua fata sinant, jam tum *tendit*que *fovet*que.

2. Miratur molem Æneas, magalia quondam:
Miratur portas, strepitumque, et strata viarum.
Instant ardentes Tyrii: pars ducere muros,
Molirique arcem, et manibus *subvolvere* saxa:
Pars optare locum tecto, et concludere sulco.
Jura magistratusque *legunt* sanctumque senatum.
Hic portus alii *effodiunt*; hic alta theatris
Fundamenta locant alii, immanesque columnas
Rupibus *excidunt*, scenis decora alta futuris.

II. Grammatical Questions.

(*For those Candidates who take Virgil.*)

1. Decline in full and give the gender of *terris, currus, portus, rupibus.*

2. Give the first person singular of the present and perfect indicative, and also the supine and infinitive of the verbs in italics.

3. Parse *quondam, theatris, rupibus, decora.*

4. What are *deponent* verbs and *impersonal* verbs? Give three examples of each.

III. Translate into Latin:—

C. For all Candidates.

1. The ambassadors told Cæsar all things. 2. Our men were drawn up in line of battle. 3. It is difficult to please all. 4. My father cannot be persuaded to sell his house. 5. So it came to pass that the Greeks took the city, and set it on fire.

ARITHMETIC.

(*Time allowed—from* 12.30 *to* 2 *p.m.*)

1. If a person has a yearly income of £350, and he spends at the rate of £78 10*s.* 8¾*d.* in 85 days, how much will he be able to lay by at the end of the year?

2. Multiply the sum of $3\frac{2}{3}$, $4\frac{3}{4}$ and $4\frac{4}{5}$ by the difference of $7\frac{6}{7}$ and $5\frac{5}{6}$; and divide this product by the sum of $94\frac{1}{8}$ and $93\frac{1}{9}$.

3. Multiply ·0235 by 8·08; and divide ·0625 by 2·5.

4. How many yards of matting 2·4̇ feet broad will cover a floor that is 27·3 feet long and 20·16̇ feet broad?

5. A person buys 3 hectares 40 ares* of land for 12,500 francs; at what price per hectare must he sell it so as to gain 1100 francs?

6. If with 53·46 kilogs. of thread a man can weave 231 metres of linen 1·14 metre broad, how many metres of linen ·95 metre broad, can he weave with 37·8 kilogs. of thread of the same quality?

7. In what time will £91 13*s.* 4*d.* amount to £105 6*s.* 0½*d.* at $4\frac{1}{4}$ per cent. per annum?

* Through a printer's error this word appeared as "acres" in the question papers placed before the candidates; but we are informed that no candidate has been prejudiced by the error.—Ed. Pharm. Journ.

English.

(*Time allowed—from* 3 *to* 4.30 *p.m.*)

1. Define *mood* and *tense.* Name those tenses of the English verb which are formed by inflexion. By what means are the other tenses supplied?

2. Analyse the following sentence:—

"The raven himself is hoarse
That croaks the fatal entrance of Duncan
Under my battlements."

3. Parse fully the following sentence:—

"How ill the scene that offers rest,
And heart that cannot rest, agree."

4. Punctuate the following passage. and, where necessary, put in capital letters:—my dear hercules said she i find you are very much divided in your thoughts upon the way of life you ought to choose be my friend and follow me i will lead you into the possession of pleasure and out of the reach of pain hercules hearing the lady talk after this manner desired to know her name to which she answered my friends and those who are well acquainted with me call me happiness but my enemies and those who would injure my reputation have given me the name of pleasure.

5. Write a short composition on *one* of the following subjects:—

The House of Lords.
The Influence of Newspapers in Great Britain.
Choice of a Profession.
The Metric System.

EXAMINATIONS IN EDINBURGH.

July 16, 17 *and* 18, 1884.

Present on each day—Messrs. Baildon, Clark, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Maclagan attended on the 16th and 17th on behalf of the Privy Council.

MAJOR EXAMINATION.

One candidate was examined, but failed to pass.

MINOR EXAMINATION.

16*th.*—*Twelve* candidates were examined. *Eight* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Clarke, Walter.....Bromley.
Emerson, John.. .....West Hartlepool.
Fell, Joseph .....Dumfries.
Gardiner, David .....Dundee.

17*th.*—*Fourteen* candidates were examined. *Five* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hopper, James Henry.....Ryde.
Knowles, Robert .....Over Darwen.
MacCreath, David .....Newton Stewart.
Mackenzie, Alexander.....Leith.
McMurtrie, John .....Glasgow.
Miller, John Wilson .....Perth.
Morrison, John... .....Belfast.
Munro, Edwin James .....Edinburgh.
Ness, Thomas .....Edinburgh.

18*th.*—*Fourteen* candidates were examined. *Eight* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Newton, John Titus.. .....Sedgley.
Pettigrew, James.....Glasgow.
Rowell, John George .....Headingley.
Smith, Burgess .....London.
Smith, Walter .....Irvine.
Waldron, Arthur .....Willenhall.

PRELIMINARY EXAMINATION.

The Certificate of Edinburgh University in favour of the undermentioned was received in lieu of the Society's Examination:—

Findlay, John .....Edinburgh.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The Annual Meeting of this Association was held on Thursday, July 17th. Professor Attfield, F.R.S., President, in the chair.

The Honorary Secretary (Mr. Wyndham Dunstan) read the following—

Annual Report of the Executive Committee.

The Executive Committee of the School of Pharmacy Students' Association have transacted the business of the past session at five Committee meetings.

At a meeting held on November 29, 1883, the Secretary reported that nomination papers had been printed at the commencement of the session, and forwarded to all members who had previously paid their annual subscriptions.

At a meeting held November 29, 1883, the following gentlemen were appointed as a Committee of Reporters, to report upon the progress made in the various branches of science allied to pharmacy:—

Pharmacology	Mr. H. G. Greenish.
Practical Pharmacy	Mr. R. A. Cripps.
Botany	Mr. E. Baily.
Materia Medica	Mr. W. Elborne.
Physics	Mr. H. Allen.
Organic Chemistry	Mr. W. R. Dunstan.
Inorganic Chemistry	Mr. A. J. G. Lowe.
Analytical Chemistry	Mr. C. Thompson.

At the same meeting the Secretary read a letter from the lady-students in the School of Pharmacy, applying for admission as members of the Association. To this the Secretary replied that he had no power under the existing rules to admit them. The Secretary suggested that as the admission of lady-students would involve the alteration of one of the rules, the desirability of an entire revision of the rules might be considered. Your Committee decided that it was desirable that lady-students should be admitted as members of the Association, and that this opportunity should be taken of entirely revising the rules.

The Secretary was requested to prepare a draft of revised rules.

At a meeting held December 4, 1883, this draft was adopted by your Committee. A special general meeting of members was summoned for the same day, when the revised rules were unanimously agreed to. They subsequently received the sanction of the Council of the Pharmaceutical Society.

The rules, as thus revised, reflect in an eminent degree the present organization of the Association, and your Committee have every reason to believe that they will be found of great service in the future in guiding the affairs of the Association.

Your Committee have made the following grants from the Research Fund:—

November 29, 1883.—Five shillings to Mr. T. S. Dymond for investigating the Reported Synthesis of Uric Acid and the preparation of pure Benzoic Acid from Hippuric Acid.

January 10, 1884.—Seven shillings and sixpence to Mr. W. H. Ince for experimental work on Hydroxylamine.

May 29, 1884.—Ten shillings and sixpence to Mr. R. A. Cripps for the examination of Commercial Concentrated Infusions and Decoctions.

The results obtained by the members who have received grants have, in every case, formed the basis of communications to the Association during the session.

At a meeting held July 17, 1884, the following statement of the Committee of Reporters was read by the Secretary on behalf of the Committee:—

The Committee of Reporters on Science have, since their appointment in November, 1883, held two meetings for the transaction of business.

At a meeting held November 29, 1883, Mr. Greenish was elected Chairman, and Mr. Dunstan Secretary to the Committee. At the same meeting the order of Reports for the ensuing session was arranged.

The following reports have been made by the members of the Committee during the session:—

Report on Pharmacology, by Mr. H. G. Greenish—"Notes on *Nigella sativa* and *Nigella Damascena*."

Two Reports on Practical Pharmacy, by Mr. R. A. Cripps—"Tincture Deposits" and "Concentrated Infusions and Decoctions."

Report on Botany, by Mr. E. Baily—"Continuity of Protoplasm in the Vegetable Cell."

Two Reports on Materia Medica, by Mr. W. Elborne—"Munjeet in Chiretta" and "Commercial English-prepared Cod Liver Oil."

Two Reports on Physics, by Mr. H. Allen—"Holtz's Electrical Machine and its Modifications."

Report on Organic Chemistry, by Mr. W. R. Dunstan—"Metaldehyde."

Two Reports on Inorganic Chemistry, by Mr. A. J. G. Lowe—"White Phosphorus and the Fluorescence of Iodine Vapour" and "The Purification of Crude Antimony Sulphide."

Two Reports on Analytical Chemistry, by Mr. C. Thompson—"Separation of Chlorides, Bromides and Iodides" and "Separation of Cobalt and Nickel."

This statement was approved by your Committee.

It will be seen from this that the session has been one of increased activity, and your Committee find especial pleasure in pointing to the work done with the aid of the Research Fund, which has met a real want, and has led to the production of some of the most important papers of the session.

The following statistics indicate the prosperous development of the Association during the past session.

The number of members upon the books is 83, of which 6 are ladies, being an increase of 21 on last session, and the number of meetings held has been 16, including to-night's annual meeting, that is, two more than last session. The gross attendance has been 284, and the average attendance at each meeting 19.

Twenty-nine communications, viz., 13 reports and 16 papers have been read; an increase of three on last session. The following is a list of the papers:—

"Science, its Abuse and Use," by Mr. J. Ince.

"The Preparation of Pure Benzoic Acid from Urine," by Mr. T. S. Dymond.

"Relation of Pharmacy to Therapeutics," by Mr. R. W. Giles.

"Hydroxylamine," by Mr. W. H. Ince.

"Iodide of Cadmium," by Mr. F. W. Short.

"The Crystallization of Phosphoric Acid," by Mr. P. L. Huskisson.

"Some Silicon Compounds," by Mr. F. McDiarmid.

"Notes on the Synthesis of Uric Acid," by Mr. T. S. Dymond.

"Unofficial Indigenous Materia Medica," by Mr. E. J. Eastes.

"The Crystallization of Sodium Hydrate," by Mr. R. A. Cripps.

"Plants or Animals," by Mr. C. Shapley.

"The Botany and Materia Medica of Linseed," by Mr. E. H. Earle.

"The Chemistry of Linseed," by Mr. E. Cullinan.

"Notes on Asafœtida," by Mr. R. W. C. Pierce.

"A Process for the Separation of Chlorides, Bromides, and Iodides," by Mr. W. R. Dunstan.

"Eykman's Process for Estimating Ethyl Nitrite," by Mr. T. S. Dymond.

Thirteen of these papers and ten reports have been published in full by the Editor of the *Pharmaceutical Journal*, as well as abstracts of all the others.

The Treasurer's accounts, to be presently audited, show that the receipts have exceeded the expenditure by £1, leaving a total balance of £12 11*s.* 1½*d.* in the hands of the Association.

Messrs. Eastes and Cullinan were then appointed as auditors to examine the Treasurer's accounts, which they reported to be correct.

After a discussion upon sundry points raised by the report, the President congratulated the Association upon the progress made during the session.

Mr. J. W. Steward then moved the adoption of the report, and speaking on behalf of the present students, indicated the advantages and utility of the Association, especially to advanced students in the school.

Mr. A. T. Job, in seconding the adoption of the report, referred to the Research Fund as a decided stimulus to students in commencing experimental work of a more or less original kind.

Mr. R. W. Giles, as one of the oldest students of the school, supported the motion. He thought the papers during the past session had been most creditable to the Association, which had, like other features of the Society, developed materially since his student days. Comparing the papers of that time (which were literally students' productions) with those of the present, he feared that the former would be considered almost puerile. No doubt the Association now owed much of its success to the impulse received from its President and from the help of its officers, who were in many cases past students. Everything brought its alloy, and he feared whether the merit of these more ambitious communications did not exercise some deterrent effect upon the contributions of younger members for whose benefit the Association chiefly existed. That would be an unfortunate result, and he would endeavour to counteract it. It might seem too late to make that attempt now when they were on the eve of dispersing, but all would feel, as he had felt at the end of his student session, that ten months was all too short a time in which to qualify themselves with the scientific knowledge necessary for a creditable career in pharmacy, and some no doubt would return for another session, while those who were denied that opportunity would find themselves distributed about the country where local associations were already in existence, or where they might do good service by promoting them. To either of these classes he would say that no paper on topics of pharmaceutical interest, if honestly worked out, not solely by the aid of scissors and copious abuse of text books, but supplemented by personal investigation and painstaking verification, would ever fail to be interesting and instructive to others, and most certainly would not fail to bring home the greatest benefit to the author. He would also take the opportunity of urging upon them the duty of loyalty to the Pharmaceutical Society, an obligation which he was never tired of insisting upon, for they might be sure that not only had the Society up to the present time been the cause of all the advance that had taken place in pharmacy in recent years, but there was no other institution that could ever have any influence in further raising the position of pharmacy, and in ultimately securing for pharmacists the status rightfully belonging to a scientific vocation. In some respects it was a melancholy retrospect to look back on so long a period in a man's life as had passed since the beginnings of this School of Pharmacy Students' Association, and they would find that the only thing that could really mitigate their regrets would be a consciousness that they had not passed those years unworthily, that they had done something for their own credit, and something for the advancement of the community to which they belonged.

The Secretary said that he did not consider that some of the carefully worked out papers which had been read that session had any but a stimulating effect on the younger students; in fact, some of the papers read by present students during the latter part of the session, showed that this was actually the case. It was necessary at the beginning of each session, that old students should take the lead in contributing papers, and it was desirable, remembering the objects of the Association, that these papers should be of as practical and original a character as possible. He fully agreed with what Mr. Giles had said in reference to the utility of the Association to students in the School of Pharmacy.

After some remarks from the President, the motion was put and carried unanimously.

On the motion of Mr. Giles, seconded by Mr. W. Elliott, a vote of thanks was unanimously passed to the President and other officers of the Association. The President, Secretary and Assistant-Secretary having replied, the Association adjourned over the summer vacation.

INTERNATIONAL HEALTH EXHIBITION.

Conference on Meteorology in Relation to Health.

A Conference on this subject was held on the 17th inst., at the International Health Exhibition, convened by the Royal Meteorological Society. Mr. J. Norman Lockyer, F.R.S., occupying the chair.

In opening the proceedings Mr. Lockyer pointed out the important connection between meteorology and the subject of the Exhibition, for the possibility of life, and by consequence of health, depended on the cosmical condition of the planets or heavenly bodies, some of which were supposed to be inhabited, whilst others certainly were not. The earth, like many other heavenly bodies, was a planet in a gradually cooling state, and this condition rendered life possible.

The first paper was by Dr. Tripe, Medical Officer of Health for Hackney, on "Some Relations of Meteorological Phenomena to Health." He pointed out that these relations had excited attention for ages past, but the knowledge concerning them was very vague, owing to deficiency of accurate observations, and an attempt made by the Society of Medical Officers of Health for London to collect and publish statistics had failed, partly through want of funds and partly through irregularity in the returns. The effect of variations in the barometric pressure might easily be over-estimated, the chief importance of them arising indirectly as indicating changes in the amount of moisture, or an increase in the escape of ground air into basements of houses. Temperature was in some respects more important, though experience had shown that man can bear greater variations than any other animal; but the effects of high temperature, again, were very much dependent on the amount of moisture in the air. The effects of temperature depended not so much on the mean as on the extremes, and these effects in hot climates were often obscured by differences in habits, diet, etc. The direct influence of rain, again, was very marked, but when the ground water came within five feet of the surface level, unhealthy effects were generally produced. Varying amounts of moisture in the air materially affect health and comfort, but the relative proportion is more important than the absolute. The author then gave a number of statistics derived from his own observations, dating from 1847, showing the relation between changes of temperature and certain specific diseases, such as scarlet fever, which seemed to be checked by a low temperature; while a sudden fall of the thermometer was connected with an increase of deaths from lung diseases. Diarrhœa also seemed to depend in great measure on temperature; but in all these cases other causes were also at work and were probably more important.

Mr. G. J. Symons (Secretary to the Royal Meteorological Society) read the next paper, on "English Climatological Stations," in which he described the apparatus required for making meteorological observations. The purpose was to obtain the highest, lowest and mean temperatures, the range of temperature and the humidity of the air, all of

which had an important influence on health. A rain gauge was also very important, since the rainfall was indirectly of vast importance as affecting the water supply. The Society had already established eighty-two stations in different parts of the country, but more are still required. The number requisite depended largely on the physical configuration of the district, or even of the towns, for, as had been pointed out some time ago, one town, such as Brighton, might have three distinct climates. In conclusion the author urged the collection by competent persons of a complete statistical record of the health rate, death rate, geology, climate, water supply, drainage and general conditions of all health resorts and watering places.

A long discussion ensued, in which Messrs. Lawson, R. H. Scott, F.R.S., Dr. Mann, F.R.S., Dr. Carey, C. G. Talmage, Morley, Strahan, Harding Wilson, Sparks, Professor Matthew Hay, Baldwin Latham, and Rev. F. Gilbert White took part, and during the course of which reasons were given for believing that the level of the underground water had a material bearing on the prevalence of zymotic diseases.

The Conference then adjourned.

The Conference on this subject was resumed on the 18th, at the International Health Exhibition, Dr. Gilbert, F.R.S., occupying the chair.

Mr. R. H. Scott, M.A., F.R.S., read the first paper entitled "The Equinoctial Gales: Do they occur in the British Isles?" There was a current theory that storms were particularly frequent and heavy at the period of the equinoxes, and the object of this paper was to ascertain whether this idea is well founded. The last fourteen years had been carefully examined, only severe storms being reckoned, and the general result was to show that there is no marked maximum at either equinox, though it by no means followed that there were not severe storms at those periods which passed north or south of the British Isles. The stormiest period of the year is the end of January, the next in order being the end of November and the beginning of October. Tables were appended to the paper, giving the dates of storms, their diurnal frequency, etc.

After some remarks by Dr. Mann and Mr. Symons, Dr. Tripe suggested that the popular fallacy with regard to equinoctial gales would be partly accounted for by the change from old to new style when the people were, as was said, robbed of eleven days, which would throw the equinox later. Mr. Lawton did not agree with this explanation, which would not apply at all to the spring equinox, and thought the idea probably came from Italy, where, there was no doubt, storms were very numerous and severe at the equinoxes.

The next paper was on "Some Occasional Winds and their Influence on Health," by Mr. W. Marriott. He pointed out first the cause of wind, viz., differences of temperature, and referred to the prevailing winds in different parts of the globe at certain times of the year, such as the trade winds, this part of the paper being illustrated by large diagrams. The evil effects of east wind were then considered and shown to arise from the abstraction of heat and moisture. The mistral, a violent north-west wind prevalent at certain seasons in the Gulf of Lyons, was also a cold dry wind which parched all vegetation, and caused dry pleurisy and pneumonia. Other winds, however, equally or more deleterious, were hot, such as the sirocco of North Africa, the simoom of India, and the hot wind of Australia. Invalids, it is pointed out, should choose a residence sheltered from cold and dry winds: from the hot winds referred to, there seemed to be little or no protection.

Mr. R. H. Scott, M.A., F.R.S., read a paper on "Cumulative Temperature." The purport of this paper was to explain a series of diagrams exhibited in the meteorological annexe, showing in a graphic form the march of temperature, rainfall and bright sunshine from the beginning of the year and also for the entire year 1881. The object of these curves was to show clearly some of the most important factors in the growth of crops, and quotations were given from Messrs. Lawes and Gilbert to show that heavy crops, both of hay and wheat, were materially influenced by the character of the winter and early spring, the quantity of the crop appearing to depend largely on early development. It appeared from the investigations of Professor De Candolle that plants do not begin to give indication of active vegetation until the temperature rises above 42° F., and the really practical object therefore of observations was to ascertain the extent to which the temperature exceeded or fell short of that datum.

General Strachey having explained the method by which he arrived at the formula given in the paper for making the calculations, the discussion was continued by Dr. Mann and the Chairman, and the proceedings concluded with the usual vote of thanks.

Conference on the Removal of the Sick.

A Conference was held on Monday, at the Exhibition, by the St. John Ambulance Association. Sir James Paget, Bart., F.R.S., occupying the chair.

The first paper read was by Mr. John Furley, "On the Carriage and Removal of the Sick and Injured." The author expressed his disappointment that the ambulance department in the Exhibition was so incomplete, which he attributed in great measure to a misunderstanding of what is comprehended under the term. The National Aid or Red Cross Society was established for the purpose of aiding in the care and transport of the wounded in time of war; but the St. John Ambulance Association was not so limited, though it was probable that in the event of war, many who had been trained by the latter society would render valuable aid to the Army Medical Department. Meantime, owing to the work it had done during the last six years, a great improvement was noticeable in the manner in which accidents in civil life were treated, whether by the police, or by workmen, miners or others. Part of this improvement was owing to better knowledge and part to improvements in stretchers, carriages, litters and other appliances. It was to be regretted, however, that in many cases public authorities declined going to the expense of special carriages, and relied on old cabs and omnibuses for this purpose. An instance was given of a invalid being brought from Cannes to London, on an "Ashford" stretcher, without having to be disturbed during the whole journey. The paper concluded with an account of the organization established by the Association for moving invalids, or those suffering from accidents, either to hospitals or to their homes in the country, or from the country to London, and with a suggestion for the foundation of a permanent museum for the display of ambulance material.

Mr. V. B. Barrington Kennett, M.A., L.C.M., read a paper "On the Ambulance Organization of the Metropolis during Epidemics." It contained a description of the arrangements made by the Association for providing ambulance carriages in case of need to transport patients suffering from infectious diseases to hospitals. At three of the small-pox hospitals belonging to the Metropolitan Asylums Board, in the neighbourhood of London, horses and waggons are kept ready for use, and they are in telephonic communication with the central office in Norfolk Street, Strand. After taking a patient to any hospital, the carriage is at once disinfected at the hospital, before returning to the station. In order to avoid concentrating too many infected cases in London hospitals, a floating hospital has been established on the Thames, near Purfleet, and a convalescent camp some four miles south. A description of the ambulance carriages was given and some statistics as to the work done. For instance, in the week ending July 5, there were 832 removals, including cases taken to hospital and to the

camp, and discharged patients conveyed to their homes. There are four ambulance steamers and when arrangements are completed, there will be four ambulance wharves established, two on each side of the river. At the convalescent camp, at Darenth, there are over 900 patients and there have been as many as 1200.

A discussion ensued, in which Baron Dr. Mundy (Austrian Army), Sir Joseph Fayrer, K.C.S.I., Dr. Billings (U. S. Army), Dr. Crawford, Director-General, Army Medical Department, Mr. Harrison, Dr. Farquaharson, M.P., Surgeon-Major Hutton and Sir E. Lechmere, M.P., took part; and the Chairman, in concluding spoke vely warmly in favour of the work of the Association.

At half-past five a lecture on "Smoke Abatement" was delivered by Mr. Ernest Hart. Sir Frederick Pollock, Bart., in the chair.

The lecturer, after referring to the injury caused to public health by the smoke nuisance, referred to the good work which had been done by those who promoted the exhibition of smoke abatement apparatus and suggested that the inhabitants of large cities should burn anthracite coal in properly constructed grates, or cook by means of gas. He also strongly advocated the importance of the appointment of a Royal Commission to inquire into the whole matter.

A two days Conference, convened by the Epidemiological Society, was opened on Tuesday, under the presidency of Dr. Norman Chevers, C.I.E., who gave an opening address on Health in India.

Dr. Chevers commenced by stating that the object of the Society was to watch such pestilences as that which now occupied part of Europe, to trace their history, causes and fluctuations, and, if possible, to ascertain the means of prevention or cure. Coming to the main object of the paper, the author pointed out that an Englishman in India, if of sound constitution, though he ran the risk of cholera and marsh fever, was pretty safe from many maladies common in England, such as pulmonary complaints, cancer and gout. One of the great causes of disease and death in India was famine, but this never occurred over the whole continent at once, so that good means of communication were the most efficient sanitary measures. A great deal of sickness and premature death occurred in Bengal from the habit of living on poor and insufficient diet, the whole system becoming so enfeebled and the powers of digestion and nutrition so impaired that towards the last the sufferer would die of starvation even though supplied with abundance of good food. He advocated, therefore, the replacement of rice cultivation by wheat. Vaccination was carried out with considerable efficiency in India, having to a great extent superseded the native practice of inoculation. A variety of statistics were given showing the improvement in the health of European troops of late years, though the mortality was still much higher than in any other part of the world.

A paper was then read by Dr. William Squire on "Change in Type of Epidemic Disease." It was pointed out that appparent changes in the character of disease were often due to individual idiosyncrasy or to the effects of chill or fatigue; there were also variations in intensity noticeable in most epidemics, depending first on the season of the year, and, secondly, increase of malignity at more remote intervals. Differences in epidemic disease, as described, were also sometimes due to change of attitude in the observer. Scarlet fever seemed especially liable to variation and diphtheria was almost equally variable. Persistence of type with variability of manifestation was thus shown to be an attribute of most epidemic diseases.

After a discussion, in which Mr. Siggins, Surgeon-Major Pringle, Dr. Armstrong (Newcastle), Mr. Lawson (Inspector-General of Hospitals), Dr. Cullimore, Mr. Scriven, etc., took part, the Conference was adjourned until Wednesday.

Later in the afternoon a lecture on "Thrift in its Relation to Health" was delivered by Dr. George V. Poore, F.R.C.P. Professor John Tyndall, F.R.S., in the chair.

The lecturer defined "thrift" as the art of avoiding waste, and of putting everything to its right use. By making a thrifty use of refuse matter people would escape many of the diseases now so prevalent. Refuse matter was too often regarded as something to be put out of sight, but if it was put to the right use and into the right place dirt and filth became practically non-existent. Refuse used unthriftily bred pauperism, annoyance and disease; but used thriftily it bred health, wealth and pleasure. Sore throat, typhoid fever, cholera, diarrhœa and diphtheria were due to the wrong use of refuse. The lecturer strongly condemned the practice of disseminating these diseases in the way now done by means of the sewer, and recommended that all putrescible matter should be dried or burnt. It was well known that no epidemic had ever arisen from the treatment of these matters on the dry earth principle, and, therefore, from a purely scientific point of view it was the best and the only right method of disposing of refuse. One of the evils consequent on sewage schemes was overcrowding, and all great sewage schemes involved an enormous initial outlay and a large annual expense, and pressed very unfairly on the inhabitants. The owner of a villa who might have the laudable desire to use and purify his own refuse matter was more heavily taxed than he who was absolutely dependent on the public authorities for the removal of fifth from his residence. The first essential for encouraging the individual householder to do his duty was an equitable adjustment of sanitary rates.

The Chairman, in proposing a vote of thanks to Dr. Poore, said now that the country was threatened with the scourge of cholera it behoved the public press to seek advice from those competent to give it before enunciating opinions which might have an evil effect on the community. Such a lecture as they had just listened to would go far to prepare the community to cope with cholera whenever it appeared. He also strongly advocated the use of disinfectants.

The Conference of the Epidemiological Society resumed its sitting on Wednesday morning, under the presidency of Dr. Norman Chevers, C.I.E.

The first paper was on "Leprosy in India," by Surgeon-Major Pringle, M.D. The writer is of opinion that this dreadful disease is on the increase, but that there is no reason why it may not be checked and eventually extirpated if proper means be taken, it being purely hereditary and neither contagious nor infectious. The only method, he said, by which the disease could be checked, was the establishment of asylums to which the afflicted could be removed when the symptoms first manifested themselves, which would be at the same time more effectual and humane than the old native plan under which the sufferers were put to death in various ways.

After a long discussion, in which Dr. Carey, Surgeon-General Balfour, Dr. Hayward, Surgeon-General Manipore, Dr. Wilson, Dr. Ewart, Dr. Armstrong, and others took part,

The Chairman gave a *résumé* of the appearance and comparative prevalence of typhus fever during the present century, at the conclusion of which he expressed an opinion that the disease was by no means extinct, and that an outbreak as deadly as any in former times might some day occur in London.

Dr. Armstrong (Newcastle) gave some statistics with regard to typhus fever in that town, and rather controverted the Chairman's opinion that these outbreaks were

due to a "wave" of disease, and thought the term "crop" much more applicable.

The Chairman in reply, said he did not dispute that insanitary conditions were of great importance in determining the outbreak, but, if they were the sole conditions it was difficult to account for periods of immunity.

After the adjournment for luncheon, Dr. Lawson, Medical Inspector-General of Hospitals, read a paper "On the Aspects of Cholera in Europe and elsewhere." After distinguishing between the two diseases called cholera, viz., simple summer cholera, or cholera nostras, and Asiatic, or cholera morbus, he said this last usually appeared as an invading epidemic and extended over large districts or countries; but since its first appearance in Europe in 1830, there had been sporadic cases nearly every year. The relation of these isolated cases to those in an epidemic was of the highest importance to determine, but as yet no agreement had been arrived at, the great point of difference between different schools of epidemiologists being whether the disease is always propagated from man to man, those who hold this view being always inclined to dispute the genuine character of sporadic cases. This dispute was very prominent amongst medical men in France at the present moment. Numerous instances were adduced in which malignant cholera had broken out at a distance from any point where the epidemic prevailed and where no evidence could be obtained of its importation, and it was contended that the nature and mode of diffusion of cholera could not be explained by any theory in which these were not included. The theory of Dr. Koch that cholera is due to a particular form of bacillus, which he has found in the discharges, and also in a tank in Calcutta, was supported by a certain amount of evidence, but various objections were made to it, and it could not as yet be said to be established.

A long and interesting discussion followed, in which considerable differences of opinion were manifested on the point specially referred to in the paper. Brigade-Surgeon Scriven attacked Dr. Lawson's views and intimated that in India the opposite opinions did not get fair play from the medical authorities. Sir R. G. Hunter, on the other hand, supported Dr. Lawson; and Dr. Thrupp, at the close of the meeting, expressed his opinion that the first and most pressing duty of English medical men was to examine Dr. Koch's theory and satisfy themselves whether it were correct or not. Surgeon-General Murray, who said that the so-called cholera bacillus had been observed many years ago in India, and was not peculiar to choleraic patients, Dr. Pringle, Dr. Haughton and Dr. Squire also took part in the discussson, which terminated with a vote of thanks to the Chairman.

Review.

EXPERIMENTAL CHEMISTRY FOR JUNIOR STUDENTS.* By J. EMERSON REYNOLDS, M.D., F.R.S. Part III. Metals and Allied Bodies.

The first part of Dr. Reynolds's book was hailed on its appearance as something of a new departure in chemical teaching. The second part, though useful and correct, had not much claim to originality, and similarly the third part cannot be said to be based on a new idea. The author has aimed at giving a knowledge of the chief properties of the metals and their compounds by a scheme of experiments, which reminds an old student in the Society's Laboratory of those parts of Attfield's 'Chemistry' which treat of the metals. That this method of giving a practical knowledge of these elements and their compounds is excellent none will doubt. We do not, however, entirely agree with the author's remarks on the use of the tables usually given for helping students to a knowledge of the method of separating the metals in analysis. That the tables of themselves are educationally valueless we entirely agree, and that backed up by incompetent teaching they are worse than valueless, we also agree. But properly used, after a course of proper preliminary instruction and under proper guidance, the educational value of work done with the help of these tables is very considerable.

The selection and arrangement of the experiments in Dr. Reynolds's book are good, and working through them thoughtfully would lay the foundation of a sound knowledge of the chemistry of the metallic elements. Taking them altogether, Dr. Reynolds's three little volumes constitute a considerable contribution to our means of educating by chemistry.

* London: Longmans, Green and Co. 1884. Fcap. 8vo. Pp. i.-viii., 1-320.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

DESTRUCTION OF BRITISH FLORA.

Sir,—It is a matter of regret to all lovers of natural science when any part of the great and wondrous scheme of creation is interfered with.

Those who admire flowers, whether they be botanists or not, must deplore the wanton destruction of their favourites.

Beautiful and interesting species have been exterminated by ignorant cadgers or unscrupulous traders in our native flora.

Many years since the *Cypripedium* (lady's slipper) was abundant in Bolton Woods, Yorkshire, until the spot was visited by an enterprising Cockney, who employed any number of rustics to grub up the plant at 2*d*. a root, to be transported from their delightful home to languish and perish on the arid window sills of a wilderness of bricks and mortar.

The same thing has occurred with the *Asplenium*, *Adiantum veneris* (maidenhair fern) and the beautiful little *Hymenophyllum tunbridgensis* (Tunbridge Wells fern).

The fern destroyers are out all tho summer, and bring their spoils to Covent Garden, or hawk them about from door to door. They usually bring the hardier kinds, as *Scolopendium* (hart's tongue), *Lastrea filix-mas* and *F. fœmina* (male and female ferns), and many others that adorn our hedgebanks and coppices. Such marauders should not be encouraged. They are generally a set of lawless vagrants, who if they go on in their reckless course will in the end not leave a single representative of the genera.

Another source of complaint is the drainage and enclosure of common lands.

Wimbledon is an example. Twenty years ago many species of bog and marsh plants were abundant; now you cannot find a single specimen of *Menyanthes trifoliata* (bog bean), or even a small patch of *Sphagnum* (bog moss). *Drosera* has long since disappeared, although I have seen the ground fretted over with it like a garment of rich brocade glistening in the early morning sun.

Speculating builders, too, find "eligible sites" upon which they not unfrequently erect villas that are never occupied, and even never finished, as at Wallington and Surbiton; these levellers cut down sheltering trees and shrubs that protect and foster many delicate plants.

I have found the *Aquilegia* (columbine) and the *Serapias ensifolia* (snow-leaved helleborine) at Reigate, but on revisiting the place all was changed.

A wealthy cit. has bought a hill, erected a fence around it, with notices conspicuously stating that "Man-traps and dog-spears are placed here."

This hill was a good hunting ground for many choice species of orchis and ophrys. To make matters worse, the enlightened owner of the estate has turned down a lot of rabbits, which may be seen grubbing up and devouring every tuber they can find.

Near Gomshall we found a small patch of bog, a perfect garden of delights, in which we spent many hours. It was thickly studded with *Menyanthes* (which in the esteem of Mr. Curtis "may compete for beauty with the choicest

exotics"), Lychnis, *Orchis latifolia* (marsh orchis), with a rich undergrowth of such plants as *Anagallis tenella* (bog pimpernel), *Hypericum elodes* (marsh St. John's wort), and many others too numerous to mention in this space.

A subsequent visit revealed an unpleasing fact; the erection of sheds, steam sawing-machines, and other significant indications of industrial occupation. Next visit we may expect further encroachments; perhaps the disappearance of the bog, or a row of "desirable residences" on the site.

Is there no remedy for this unfortunate state of things? Government has of late years shown a laudable desire to preserve some of our suburban recreation grounds. The "Ten commandments" of Mr. Ayrton are still in force at Hampstead; would it not be possible to transfer to some suitable locality, say, Keston Common, specimens of all our less common wild plants before they are utterly destroyed? Such a herbarium would be of permanent value, of a still more useful, if not of so ornamental and expensive a character, as the Royal Gardens at Kew.

R. Goodwin Mumbray.

Permanganate of Potash Pills, with Paraffin, Vaseline and Kaolin as an Excipient.

Sir,—Mr. Martindale's letter on this subject in the *Pharmaceutical Journal* for the 19th inst. calls for some reply.

He complains of a lack of details in the paper published on p. 21 of the Journal, and says that the way in which the results were obtained is not shown; further, that no mention is there made as to whether the permanganate solution was acidulated or not. As a matter of course, all the permanganate estimations given in the paper were made in presence of a slight excess of sulphuric acid. The results were calculated, and constant figures given, derived from the first equation in Mr. Martindale's letter. By the way, it would be an improvement if this particular equation and the one given below it were both formulated on one distinct system, for, as they at present stand, they form a curious commentary on the demand made by chemists for greater uniformity in chemical nomenclature.

Mr. Martindale prefers the B.P. method of estimating permanganate with ferrous sulphate. The figures he gives in a blank analysis of the salt (101·6 per cent.) do not convey a very favourable impression as to its accuracy. The writer believes that in actual practice the oxalic method is very generally preferred, as being easier, quicker and more accurate.

In breaking down three of the 2 grain coated pills, Mr. Martindale says that "no apparent reduction of the permanganate took place." His own figures, deduced from an estimation of freshly made pills, show a reduction equal to 8 per cent., but whether this reduction is due to the action of the coating, or to the excipient, he very discreetly leaves us to guess.

Those pharmacists who did not know before the appearance of Mr. Martindale's letter how to make 2 grains of permanganate of potassium into a moderate sized pill will doubtless feel very grateful to him for showing "how it is done." Everyone will admit that it is more elegant to send out a $2\frac{1}{2}$ or 3 grain pill in preference to a 5 grain. For the purposes of this inquiry however, the writer considered it desirable to make all the pills intended for estimation up to a maximum of 5 grains each, in order to expose the salts to as large a proportion of paraffin excipient as possible. If the minimum quantity had been used, a critic might have reasonably urged that the main purpose of the inquiry had been frustrated. Also, for this reason, and to insure uniformity, it is intended in any future experiments to adhere to the 5 grain standard, the same form for the excipient as first suggested by Mr. Martindale being also used.

There need be no fear of spontaneous combustion in sugar-coating permanganate pills, provided that their surface is first shielded by a non-reducing substance.

In the concluding portion of his letter, Mr. Martindale asserts that permanganate "in the stomach is no doubt quickly reduced, but readily combined again, and absorbed as an albuminate." I do not know what evidence he may be prepared to offer in support of this statement, but certainly before the appearance of his letter, the writer (in common with many others) had assumed that what really took place when a pill containing permanganate of potassium was introduced into the stomach was one of those things not generally known.

In reply to Mr. MacEwan, the absolute alcohol has a slight solvent action on the paraffin excipient, and by reason of this action, it undoubtedly exercises a partially reducing effect on the permanganate contained in the pill mass. By dissolving the sandarac, as he suggests, in a liquid hydrocarbon of the $C_nH_{2n}+_2$ series, this partial reduction would probably be avoided, but the reducing action of the resin itself would still remain.

George Smith.

Sir,—In the early part of last year I read a paper before the members of the Oldham Chemists' Assistants and Apprentices' Association on "Pills and Excipients." To illustrate it I prepared a number of examples of pills, including some of pot. permang. made with the aid of Mr. Martindale's kaolin excipient. These I had by me until quite recently, when, not expecting any further use for them, I threw them away. Before doing so I had the curiosity to break up one in a mortar with a little water, which it coloured apparently as deeply as if newly prepared. I have made some grosses of these pills, and they appear to give entire satisfaction.

Kaolin and water were recommended in your pages by a correspondent, and I have tried them, but cannot recommend them for large quantities, as they stain the hands too much. It would be necessary to engage a man of colour to roll them, as kid gloves would form too expensive an item where there were many ordered.

Oldham. A. E. Martin.

The Representation of Chemists on the Pharmacopœia Committee.

Sir,—I have just returned from a canvass of the medical practitioners in this district, in order to obtain their signatures to the petition in favour of insertion of a clause in the Medical Acts Amendment Bill, whereby, provision is made for the representation of pharmacists upon the committee for the compilation and revision of the British Pharmacopœia. My success has been such that I cannot refrain from making it known for the encouragement of other local secretaries. In every instance the petition was signed with the greatest readiness; and in several cases, much surprise was expressed that practical chemists had not been found upon the committee for the drawing up of the two previous national pharmacopœias.

Buxton. R. Wright.

*** We have much pleasure in referring to the list published on page 68 of the present number, which will show that Mr. Wright was by no means singular in his experience.—Ed. Ph. Journ.

T. J. Wilkes.—(1) *Spergula arvensis.* (2) *Viola canina.* (3) *Melilotus alba.*

F. A. P. Balkwill.—*Bupleurum rotundifolium.*

E. Nuthall.—If you have taken the precaution of ascertaining that your name was not included in the list of voters when this was exposed on the doors of places of worship in September (see *Pharm. Journal* for September 12 last) you are exempt from all jury service.

Country Chemist.—We think that the stipulated condition is insuperable.

Amicus (who should have sent his name) is referred to the papers by Mr. Maben and Mr. Willmott on the general subject in the last volume of this Journal.

R. Morris.—We are not in a position to advise you on the subject.

J. Hutchinson.—(1) *Alopecurus geniculatus.* (2) *Aira cæspitosa.* (3) *Lepigonum rubrum.* (4) *Agrostis vulgaris.* (5) *Trifolium minus.*

A. Scott.—*Geoffroya inermis* is a synonym of *Andira inermis*, the so-called "cabbage-tree" of Jamaica. The tincture is an ingredient in a printed formula that is probably not devised with a view to it being dispensed by any person but the originator of it.

Communications, Letters, etc., have been received from Messrs. Evans and Co., Field and Co., Aplin, Wheldon, Frazer, Greenish, Moeller, Wylde, Nolens, Gele, J. W.

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The Registrar of Trade Marks (after giving the usual public notice prescribed by Parliament to allow of opposition) has granted us the above "Trade Mark," thus officially recognising us as the "ORIGINAL MAKERS OF TASTELESS PILLS," and no pills will be sent out without this mark on all bottles or packages.

Any Formulæ Dispensed, Covered, and Estimates given.

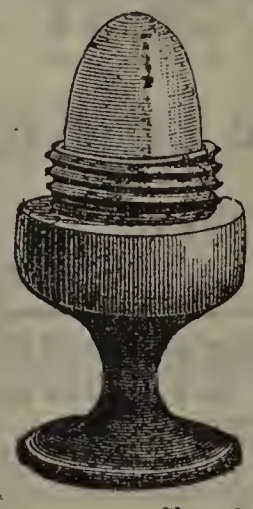
Samples, with a list of pills from upwards of 500 different forms which are kept in stock, will be forwarded free on application.

ARTHUR H. COX & CO. *Tasteless Pill Manufacturers,* **Brighton.**

PURE MENTHOL CONES,

A REMEDY FOR

Headache, Neuralgia, Rheumatism, &c.



SPECIALITY BOXES.
The lids remove, and the box serves as a holder for the Cone.
Fancy Hardwood Boxes, 9s. per dozen.
Plain Willow Boxes, 4s. 6d. per dozen.

The **Pure Menthol Cones** manufactured by us are exempt from the Medicines' Act, and can be sold without a Patent Medicine Stamp.

Show Cards and Counter Bills on application.

T. CHRISTY & CO., 155, Fenchurch St., London
Proprietors of MYOCOM FLY GUM, *in tins at* 1/-, 2/6 *&* 5/- *each.*

ALLEN & HANBURYS'

EFFERVESCENT

SALINE

This is a finely granulated preparation, which in dissolving produces a sustained sparkling effervescence, and a clear, bright solution. It possesses all the advantages of an agreeable saline, combined with the anti-febrile properties of Chlorate of Potash, of which it contains a considerable percentage. It is, in short, an efficient aperient and febrifuge, and makes an exceedingly pleasant and refreshing beverage.

PRICES. This Saline is supplied IN BULK at 1s. 6d. per pound; 1s. 5d. per pound for 14 pounds; 1s. 4d. per pound for 112 pounds; or in ½-pound bottles (to retail at 1s. 6d.), 11s. per doz.

WITH OR WITHOUT LABELS.

It is supplied also on the same terms with A. & Hs.' own Labels and Wrappers ready for Retail sale.

SAMPLES FREE ON APPLICATION.

MANUFACTURED BY

ALLEN & HANBURYS

PLOUGH COURT, LOMBARD STREET, LONDON.

Certain Sudden **DEATH**

to all Grubs, Woolly Aphis, Green and Black Fly, Lice, Red Spider, Thrip, Mealy Bug, Caterpillars, Ants, Worms, &c.

FIR TREE OIL

INSECTICIDE (Soluble in Water).

For destroying ALL INSECTS and PARASITES that infest Trees and Plants, whether at the Roots or on the Foliage. It cures Mildew and Blight on Fruit or Foliage, and a weak solution Kills all Vegetable Grubs, Turnip Fly, &c. Clears Grapes from Mildew or Mealy Bug without affecting the bloom. Thickened with a little clay, makes a good winter dressing. Destroys Lice and Fleas on Animals and Birds. Sold by Seedsmen and Chemists, 1s. 6d., 2s. 6d., and 4s. 6d. a bottle; per post 3d. extra. Per gallon 12s. 6d., or less in larger quantities.

A Treatise on FIR TREE OIL, as an Insecticide, its application to Plants and Animals, sent Post Free, on receipt of address, by the Manufacturer,

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Wholesale:—HOOPER & CO.; CORRY, SOPER, FOWLER & CO.; C. E. OSMAN & CO.; and from all the London Seed Merchants and Wholesale Patent Medicine Houses.

New York:—ROLKER & SONS.

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ARECA NUT TOOTH PASTE

Is one of the most Saleable and Best Articles in the Trade.

Sold in Pots at 6d. and 1s. each

THE 1s. SIZE IS CHEAPEST.

KEPT BY ALL WHOLESALE HOUSES.

FOR CHEMISTS.

THE CELEBRATED LONDON TEAS

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The CHOICE CHINESE SMALL TEA .. For Retail at 1/4.	**72**	per cent.
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The LONDON 3/8 TEA .. .. For Retail at 3/8.	**90**	,,

ERNEST HOLAH, *Chartered Accountant*,
30, BUDGE ROW, CANNON STREET, E.C.
Dated, LONDON, *January 17th*, 1884."

These well-known Teas, when ordered packed, are hand wrapped from the bulk, and forwarded on the day the order is received.

The extraordinary growth in the demand for them is due to the absolute regularity with which each excellent—probably unequalled—standard is maintained.

For samples, prices, and all particulars, apply to

A. HORATIO JONES, *Managing Director*.

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CHEMISTS' CASES.

SHIPPED f.o.b. in London, or sent, *carriage paid*, to any town in the United Kingdom on receipt **£10 10s.**

THESE CASES CONTAIN—

Doz.		*at per doz.*	£	*s.*	*d.*
3	**Eno's Fruit Salt, 2/9 size**	21/-	3	3	0
1	**Do. do. 4/6 ,,**	35/-	1	15	0
6	**Pear's Soap, 6d. Tablets (unscented)**	3/4	1	0	0
3	**Do. do. 1/- ,, (scented)** ...	6/8	1	0	0
	(*Or 6 doz. unscented 6d. at buyer's option.*)				
1	**Seigel's Syrup, 2/6 size**	21/-	1	1	0
1	**Jeyes' Perfect Purifier, 2/-, glass bots.**	12/6	0	12	6
	(*Or 3 doz. 6d. size at buyer's option.*)				
1	**Do. do. 1/- glass bots.**	7/-	0	7	0
2	**Do. do. 6d. ,,**	4/-	0	8	0
3	**Do. do. 3d. ,,**	1/6	0	4	6
1	**Do. Sanitary Powder, 1/-, decorated tins**	7/-	0	7	0
2	**Do. do. 6d. do.**	4/-	0	8	0
2	**Do. Dog Soap, 6d. tablets** ...	2/-	0	4	0
			£10	**10**	**0**

Cases containing half the above quantities, **£5 7s. 6d.**

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Sussex House, 52, Leadenhall St.

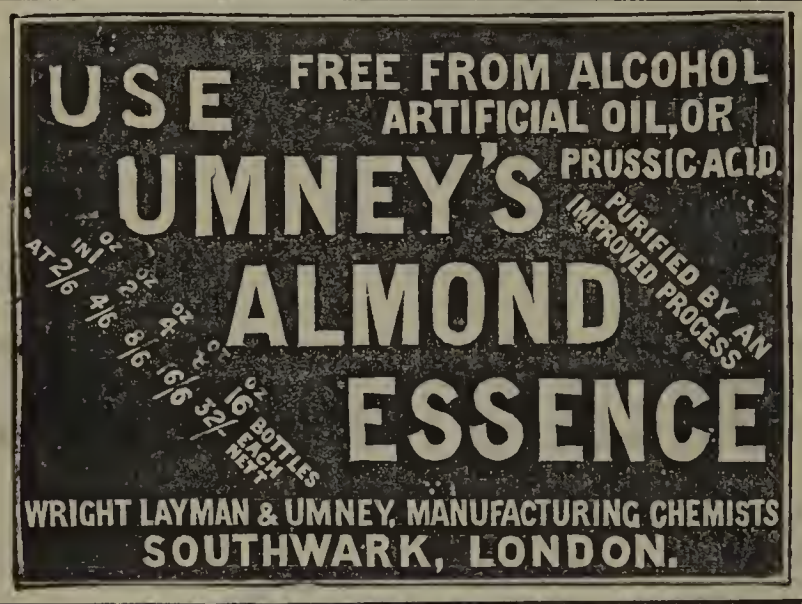
LONDON, E.C.

Chemists' Tea Agency.

WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S
INTERMEDIATE TEA, 2s. per lb.
BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—
AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.



SYMES & CO.
LIVERPOOL,
Importers of Brazilian Drugs
Araroba, Caroba, Jaborandi, Baycuru, Guaco, Quebracho, Tayuya, Coca, Tonquin Beans, &c.

PETROLEUM JELLY,
EQUAL TO AND CHEAPER THAN VASELINE.
SANITARY FLUID AND SHEEP DIP,
THE CHEAPEST AND BEST DISINFECTANT.
Grease, Pitch, Asphalte, and all products of Tar and Rosin.
Samples and Prices on application.
GRINDLEY & CO. POPLAR, LONDON, E.

PRELIMINARY & MINOR.
ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 47 out of 51 Pupils passed the last Examinations.

"SYSTEMA OMNIA VINCIT."
SOUTH LONDON SCHOOL of PHARMACY
325, KENNINGTON ROAD, S.E.
Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.
FOURTEENTH SESSION, 1883-4.
Entries now begun for the term commencing Sept. next.
For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

SOUTH LONDON SCHOOL OF PHARMACY.
GENTLEMEN can receive *Private* instruction in any branch of Practical Chemistry during the Pharmaceutical vacation, until 15th September, on such days and hours as may be arranged.
Apply, W. BAXTER, SECRETARY,
CENTRAL PUBLIC LABORATORY,
325, KENNINGTON ROAD, S.E.

PRIVATE TUTOR
Mr. JAS. W. SAUNDERS
(*From the Royal School of Mines*),
6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.
As each Student is taught and works *separately*, entry may be made at any time. Individual personal attention. No Demonstrators. Postal teaching. Enclose stamp for terms, &c.
LABORATORY CLOSE TO GOWER STREET STATION.

THE UNIVERSAL
Postal System of Instruction
Has been established for the express purpose of preparing for the various examinations of the Pharmaceutical Society students residing in the country, or those unable to attend a School of Pharmacy.

Pharmaceutical Preliminary	Fee	10s. 6d.
Pharmaceutical Minor	Fee £1	1s. 0d.
Pharmaceutical Major	Fee £1	1s. 0d.
Medical Preliminary	Fee £1	1s. 0d.

TESTIMONIAL.
BUCKLEY HOUSE, LLANDUDNO,
March 10*th*, 1884.
GENTLEMEN,
Your excellent system of College training and valuable Postal Lectures have gained a well deserved repute, yet I gladly testify to the entire satisfaction I have felt in going through both one and the other.
Your course of teaching is so thorough, and your efforts to assist and wisely direct every student so unremitting, as to call for the highest praise.
I am, Gentlemen,
Yours very truly,
M. A. S.
The original of this and numerous other Testimonials may be seen at the Office.
For full particulars apply to Messrs. WILLS & WOOTTON, Trinity Square, London, S.E.

THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

At the Examinations held in London this month, 5 Major candidates from this School presented themselves. The following 4 passed:—

Mr. Clower	Mr. Hanson
,, Gradidge	,, Salmon

17 Minor candidates were recommended to present themselves for examination. The following 13 passed:—

Mr. Adams	Mr. Gray
,, Aston	,, James
,, Bayley	,, Joint
,, Gibbons	,, Hughes
,, Fisher	,, Stevens
,, Flower	,, Timm

Mr. Watson

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. Minor.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, Gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, Chemist, care of Mr. J. Edwards, Wye, Kent. Herbarium, 100 Plants, 5s.

St. Thomas's Hospital Medical School,

ALBERT EMBANKMENT, LONDON, S.E.

The WINTER SESSION of 1884-5 will commence on OCTOBER 1st, when an Introductory Address will be delivered by Sir J. Risdon Bennett, M.D., F.R.S., at 3 p.m.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle.

W. M. ORD, Dean.

WESTMINSTER COLLEGE

The next Session will commence on Monday, September 1st.

Students intending to enter on the above date are requested to send in their names as early as possible, so that benches may be reserved for them.

FEES:—

To the October Examination ...	£5 5s.
To the December ,, ...	£8 8s.
Six Months' Course	£10 10s.
Twelve Months' Course	£15 15s.

At the Pharmaceutical Examinations held this month, the following Students of the Westminster College were successful:—

*Mr. A. Banks	*Mr. J. K. Jones
* ,, W. Barker	* ,, C. O. Morrison
* ,, T. N. Brooke	,, G. Moor
,, B. H. Butler	,, G. Neale
,, H. Clarke	,, J. Newton
,, C. Ellis	,, F. Rookledge
,, W. H. Godsland	,, F. T. Sanders
* ,, E. E. Hall	,, B. Smith
,, J. H. Hopper	,, J. Sturdy
,, A. J. Hemstead	* ,, W. Sumner
* ,, J. Hulland	,, T. E. Taylor
* ,, S. Huggins	,, H. P. Withers
* ,, G. Jacques	,, H. E. Young

* Resident Students.

The following passed the Apothecaries' Hall Examination:—

Mr. A. Banks	Mr. W. H. Godsland
,, E. Burton	,, E. J. Harris
,, C. Brown	,, J. Morris
,, W. Barker	,, J. Newton
,, J. C. Chappell	,, J. Proctor
,, R. E. Gant	,, H. T. Wardale

Mr. H. P. Withers

For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON,

Trinity Square, London, S.E.

MR. JUDD'S CLASSES

Are held continuously on Monday, Wednesday, Thursday, Friday, from 7.30 to 10.0 p.m. Students can enter at any time.

The October class of morning pupils will recommence first Monday in September. Owing to individual help, students make rapid progress, and successes are scored at each Minor Examination.

For terms, call or write to

Mr. H. JUDD,

West Central School of Pharmacy,

31, REGENT SQUARE, W.C.

CANDIDATES for Medical Preliminary, London Matric., Civil Service, and Pharm. Exams. are rapidly prepared by a tutor of considerable experience (Postal system). For terms, address, with stamped envelope, George Thompson, Esq., 98, Queen St., Exeter.

CONCILIO ET LABORE.

THE MANCHESTER COLLEGE

OF

CHEMISTRY & PHARMACY

225, OXFORD STREET, MANCHESTER.

DIRECTOR:

Mr. W. SPENCER TURNER, Pharm. Chemist, &c.

Report of Classes and Notice of Proposed Arrangements.

In the last five Examinations held in London and in Edinburgh, viz.: January, February, April, June, and July, **FOURTEEN** Students from this School passed the Minor, and **TWO** passed the Preliminary, viz.:—

MINOR.

EDINBURGH, JANUARY.—Four, *viz.*:—
Mr. C. CAMPBELL, Manchester.
„ A. E. H. BLACKBURN, Eccles.
„ J. H. MORRIS, Bolton.
„ D. PATTERSON, Bolton.
Three of these were "Afternoon Class" Students.
(One passed in DECEMBER, 1883, viz.:—
Mr. J. TALLANTYRE, Manchester.)

LONDON, FEBRUARY.—Two, *viz.*:—
Mr. W. DUCKWORTH, Blackburn.
„ F. JACKSON, Manchester.
(One passed at Apothecaries' Hall, viz.:—
Mr. D. H. OXEN, Tynemouth.

LONDON & EDINBURGH, APRIL.—Four, *viz.*:
Mr. W. ASPINALL, Platt Bridge.
„ E. S. BARLOW, Oldham.
„ F. RIDDIOUGH, Leeds.
„ ALBERT SMITH, Stalybridge.

LONDON, JUNE.—One, *viz.*:—
Mr. F. A. ASTLEY, St. Anne's-on-Sea.

LONDON & EDINBURGH, JULY.—Three, *viz.*:
Mr. T. E. BARRASS, Peterborough.
„ R. KNOWLES, Darwen.
„ J. G. ROWELL, Leeds.

PRELIMINARY

APRIL.—Mr. T. E. GREENHALGH, Blackpool.
JULY.—Mr. W. R. TURNER, Stockport.

The next Session will begin on

MONDAY, AUGUST 18th,

When the undermentioned sets of Classes will be conducted by Mr. TURNER and his Assistants.

A. Afternoon and Evening Classes for the PRELIMINARY.

B. Day, Afternoon, and Evening Classes for the MINOR.

C. Day and Evening Classes for the MAJOR.

Full particulars of all these Classes are given in the new Copyright Prospectus, which is now ready for distribution

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IN THE
PHARMACEUTICAL JOURNAL.

GUARANTEED CIRCULATION
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Advertisers are requested to observe :—

1.—That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

2.—That letters addressed to initials or to fictitious names at a Post Office are not taken in, but are at once sent back to the writers by the Post Office Authorities.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers.

Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

J. & A. CHURCHILL, 11, New Burlington St., London, W.

PHARMACEUTICAL PRELIMINARY, LONDON MATRICULATION, AND ALL MEDICAL PRELIMINARIES.

RAPID and thorough preparation, privately and in class. Postal Tuition for these Examinations and Beil Scholarship. For particulars, enclose stamp, Mr. A. DAWES, 1st B.A. Lond., Adderstone, Vardens Rd., New Wandsworth, S.W. (close to Clapham Junction Station.)

ENGAGEMENTS WANTED.

WHOLESALE.—Advertiser, aged 35, with 20 years' experience in the drug trade, is open to an engagement as TRAVELLER. Highest references. TRAVELLER, 124, Portland St., Southport.

AS LOCUM TENENS. Minor and Apothecaries' Hall Experienced. Disengaged 1st week in August. Highest references. State salary. G. EMMERSON, 40. Chatterton Rd., Finsbury Park.

AS ASSISTANT.—Accustomed to superior Retail and Dispensing. Age 25. CHEMIST, 34, High St., Putney. Disengaged.

IMMEDIATELY.—MANAGER for widow, or LOCUM TENENS. Good appearance. First-class experience and good references. CHEMICUS, Barron & Co., Bush Lane, Cannon St.

AS JUNIOR. Age 21. Town or country. Well up. Z., 103, Riversdale Rd., Green Lanes, N.

ENGAGEMENTS WANTED.

AS MANAGER or out-door ASSISTANT. Permanent. Town or country. 9 years' London experience. Age 26. Good references. E. I. K., 66, Tollington Park, Holloway, N.

BY a Chemist's son, a short engagement as ASSISTANT, for about 6 or 8 weeks. 4 years' experience. W. O. G., 1, West Mall, Clifton.

AS JUNIOR. Over 4 years' experience. Age 19. Height 5ft. 7½in. Where two are kept preferred. Please state hours, &c. A., 9, Rothesay Rd., Luton, Beds.

LOCUM TENENS and TEMPORARY.—Present address of R. E. BUNN is Mr. J. W. Triggs, Chemist, Lower Barton St., Gloucester. Last attendance, Mr. Adams', Chemist, Sudbury, Suffolk.

AS ASSISTANT. Apply, stating usual particulars, to C. R. T., Manor House, Flixton, Gauton, Yorkshire.

AS MANAGER or position of trust. Many years' high class West-end experience. Disengaged. A. B., care of Mr. Howdon, 78, Gracechurch St., E.C.

AS MANAGER or LOCUM TENENS, by registered middle aged man. Single. Long experience, town and country trade. Good references. Tooth Extractor, &c. C. H., Messrs. Cross Bros., Wingate, Durham.

FOR three months.—As ASSISTANT in a first-class Dispensing business. 6 years' experience. B., W. Baxter, Esq., 325, Kennington Rd., S.E.

BY the son of a Surgeon.—As out-door DISPENSER either to a Chemist or Surgeon. 8 years' London and Provincial experience. Good knowledge of Prescribing. No objection to Sunday duty. London or South Coast preferred. 5 years with a firm of Surgeons. R. N. C., Parade Cottage, Beach Ter., Hastings.

AS ASSISTANT, in a good Dispensing and Retail business. 5 years' good experience. Height 5ft. 9in. Salary £40. Satisfactory references. A. B. C., 87, High St., Godalming.

AS JUNIOR. 4 years' experience. Age 19. Height 5ft. 7½in. Passed Prelim. Good references. Disengaged August 26th. W. J. EVANS, 3, Commercial St., Newport, Mon.

AS ASSISTANT, MANAGER of Branch, or DISPENSER to Surgeon. Out-door. 9 years' experience. Well up in Dentistry. Age 25. Height 5ft. 8in. First-class references. ALPHA, Fairfield, Bromsgrove.

ASSISTANT as DISPENSER to Surgeon or Chemist, in London, with time allowed for study. 4 years with present employer. Age 24. WILLIAM PILSBURY, Mr. Charrington, Lichfield, Staffs.

AS MANAGER or SENIOR. Permanent or temporary. Out-door. Ætat. 30. Now disengaged. CHEMICUS, 4, Fazackerley Ter., Ashton-on-Ribble, Preston.

AT once.—As ASSISTANT, for one month. Good reference. Age 23. TEMPORARY, 2, High St., Brecon.

AS JUNIOR, in London. Experience, first-class Retail and Hospital. Good references. Age 21 years. Height 5ft. 9in. CHEMICUS, Victoria Rd., New Brighton, Cheshire.

AS ASSISTANT. Minor qualification. 10 years' good experience. Age 24. Height 5ft. 5in. Now disengaged. ORLEANS, The Marshalls, Maresfield, Sussex.

A MARRIED gentleman, height 5ft 10in., shortly disengaged, requires MANAGEMENT of branch Retail, or other responsible post. Has had great experience and can be highly recommended. A. P. S., 104, Star St., Paddington, W.

ENGAGEMENTS WANTED.

AS temporary MANAGER, by a competent man, who has for several years been accustomed to take charge. Great experience in Prescribing and the Extraction of Teeth. Undeniable references. Disengaged about August 4th. JOHN PINDER, 23, Trippett, Hull.

AS MANAGER, temporary, or any position of trust. Disengaged August 1st. Registered. Married. 5 years' references. Long experience in town and country. A. H., 2, Railway Ter., Wallington.

BY qualified Chemist. Married. Age 30. 8 years in business on his own account. Situation as MANAGER of a Branch or DISPENSER to a firm of Surgeons, Hospital or Dispensary. ASSOCIATE, Mr. Thomas Rudge, Mitcheldean, Gloucestershire.

ASSISTANTS WANTED.

APPRENTICE.—H. J. BROUGH, Pharmaceutical Chemist, has a vacancy for a respectable youth as in-door APPRENTICE. Thorough personal instruction, and every home comfort. Premium required. 7, Netherwood Rd., West Kensington Park, W.

APPRENTICE.—A vacancy occurs in a first class suburban business for a well-educated, gentlemanly youth as above, where he would have a comfortable home and the opportunity to acquire a thorough knowledge of the business in all its branches. For terms and particulars apply to PHARMACIST, care of Messrs. Hodgkinson, Stead & Treacher, 198, Upper Whitecross St., E.C.

APPRENTICE.—J. STEVENS, Chemist, High St., Strood, Rochester, requires a respectable youth. The business is Retail, Prescribing, and every facility for learning the trade. Premium moderate. Comfortable home.

APPRENTICE.—A vacancy occurs in a Dispensing business for a gentlemanly youth as APPRENTICE. Good home and every opportunity of learning the business. Premium moderate. FRANK CHABOT, M.P.S., West Kirby, Cheshire.

IMMEDIATELY. — An active Junior ASSISTANT, accustomed to general Drug trade. State full particulars as to age, salary and experience, with reference, to W. ALCOCK, Broomhall St., Sheffield.

A FIRST-CLASS ASSISTANT to Chemist's business. Preference given to one with a knowledge of Mechanical Dentistry. Send photo., references, when disengaged, salary required, &c. 53, Bucks Rd., Douglas, Isle of Man.

AN ASSISTANT, about 22 years of age. Apply to J. A. SEYS, Chemist, Newport, Mon.

A VACANCY occurs in a large Dispensing and Retail business, in the centre of West-end for a well educated youth as APPRENTICE. A small premium will be taken with one who is sharp and active. W., care of Messrs. Hodgkinson & Co., 198, Upper Whitecross St., E.C.

AN ASSISTANT for a first-class Retail and Dispensing business. Apply, stating age and salary required, enclosing carte and particulars to Mr. JAMESON, 48, Baker St., W.

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AN ASSISTANT, in a general country business. Indoors. Abstainer preferred. Time for study allowed. Opportunity for acquiring knowledge of photography if desired. Apply, stating usual particulars, to W. & J. PIGGOTT, Leighton Buzzard.

ASSISTANTS WANTED.

AT once.—A Junior ASSISTANT. Good references indispensable. Apply, stating age, height, and salary required, to H. ALLEN, Chemist, Basingstoke.

AN out-door ASSISTANT. Well up in Dispensing and a good Counter hand. Apply, giving full reference, enclosing carte de visite, and stating salary expected, to GOULDINGS, Cork.

DISPENSER for a Dispensary in the central part of London. Apply by letter to D. E. F., care of Messrs. Street Brothers, 5, Serle St., Lincoln's Inn Fields, W.C.

JUNIOR ASSISTANT or STUDENT.—Indoors, for a good class Surgeon's Retail, recently opened. Small salary given, or an arrangement can be made to give time for study and lectures. Must thoroughly understand the Chemist's business. Apply (personally, if possible), to Dr. CHANDLER, 22, Battersea Rise, Clapham Common, S.W.

A JUNIOR ASSISTANT to assist in a light Retail and Dispense for a Surgeon. No night work. Apply, with full particulars, to W. S., 86, High St., Whitechapel, London, E., if personally, between 12 and 1 o'clock.

JUNIOR ASSISTANT.—At once, with good references. Accustomed to a light Retail and Dispensing business. Apply, with usual particulars, to Mr. SPENCER, Chemist, Wimbledon.

ON or about August the 9th.—A thoroughly competent Junior ASSISTANT, about 21 or 22 years of age, Minor qualification, for a Dispensing business. Good references indispensable. Apply, stating full particulars, to W. WADE, Sidcup, Kent.

AN ASSISTANT for a small business near London. Would suit one just out of his apprenticeship and requiring time for study. Must be well recommended for sobriety and honesty. Usual particulars, with carte (to be returned), to ALBUS, Messrs. Baiss Bros., Jewry St., E.C.

A COMPETENT ASSISTANT, in-door (Junior preferred), for about one month, commencing August 8th. Must be accustomed to Dispense, and able to give good references. Apply, stating age, terms, &c., to HENRY DAVIS, Northbrook St., Newbury, Berks.

AN in-door ASSISTANT, not under 21 years of age, for first-class Retail business. An accurate Dispenser and good Counterman. State full particulars as to height, salary, age, with photo., to J. C. SARGENT, 5, Fore St., Taunton.

OUT-DOOR. No Sunday duty. An active and obliging ASSISTANT, single, age about 24, Minor qualification, for a Northern seaport business. State salary required, with photo. (if convenient), and references, to DURHAM, care of John Ismay & Sons, Newcastle-upon-Tyne.

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ASSISTANTS WANTED.

JUNIOR ASSISTANT, accustomed to light Retail trade, well up in Dispensing, wanted immediately. Enclose photo. DILLON & WEBB, Hereford.

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FOR a first-class pharmaceutical establishment in a fashionable inland watering place a quick and accurate DISPENSER, of gentlemanly manners and address. Applications to be addressed to A. B. & Co., &c., Messrs. Hodgkinson & Co., 198, Upper Whitecross St., London, E.C.

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MANAGER for Chemistry and Herbalist mixed.—A Christian man and abstainer. Married. Age about 40. Permanent. One who can Dispense and Extract Teeth. Apply, H. T., 78, Chatsworth Rd., Clapton Park, Hackney.

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IN the Midlands.—Wanted immediately, a qualified ASSISTANT for a good class Retail and Dispensing business. Not over 25 years of age. Address, T. C., care of Messrs. Southall Bros. & Barclay, Birmingham.

IMMEDIATELY.—A steady, obliging JUNIOR, or one having served part of his time. State full particulars, and enclose carte. Apply, HOPKINSON & Co., Chemists, Grantham, Lincolnshire.

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BY a Pharmaceutical Chemist, a thoroughly qualified Assistant as leading Counterman in a first-class establishment. Experience and good address essential. Applications by letter addressed T. R., care of Messrs. Hodgkinson, Stead & Treacher, 198, Upper Whitecross St., London, E.C., stating height, age, &c., and salary required, in-door.

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RARE opportunity.—Retail and Prescribing Business. Established 20 years. Returns £14 weekly. Goodwill, including two specialities, £50. Stock, &c., valuation, or £600 all. No opposition, best situation in market place. Rent of shop and house £60. The district is populous and manufacturing. Apply, Messrs. Gledhill, Pharmaceutical Agency, 416, Strand, W.C.

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GENUINE Prescribing and Retail Business. Returning £8 weekly. Unopposed. Dentistry much needed. Will bear strictest investigation. Very convenient house. Handsome shop. Rent £28. Rare opportunity for young beginners. Suit either Chemist or Surgeon. To an immediate purchaser, £200; £100 of which may remain (or by valuation). Satisfactory reasons for disposal. Apply, Chemicus, care of Mr. Roberts, 56, Station Rd., Forest Gate.

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Notices on 12th and 19th inst. are cancelled. A Fee of 2/6 is charged to cover expenses of direct correspondence, &c., and is payable by Employers *and* Assistants on forwarding particulars for registration.

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Appointments for August should be made early.

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Vide LANCET, July 7, 1883.

The continually accumulating evidence that typhoid, diarrhœa, diphtheria, and the allied zymotic diseases and ailments are chiefly induced by the consumption of the ordinary drinking water supplied in town and country indicates the value to the medical profession of an absolutely pure natural mineral water which can be recommended with confidence for daily use.

APOLLINARIS NATURAL MINERAL WATER completely fulfils these conditions, as has been proved by the repeated examinations by the most illustrious chemists. Its entire freedom from all impurity, and its agreeable, refreshing, and digestive qualities have for many years secured its recognition and employment by the highest medical authorities as a valuable dietetic agent in daily use, and as a therapeutic in illness and during convalescence.

The MEMORANDUM of the LOCAL GOVERNMENT BOARD, July 13, 1883.

"If any taint (however small) of infective material gets access to wells or other sources of drinking water, it imparts to enormous volumes of water the power of propagating disease."

The DAILY NEWS, July 19, 1883, says:

"London is still supplied with drinking water from open streams exposed to choleraic infection."

ST. JAMES'S GAZETTE, Nov. 15, 1883

"THE RECENT OUTBREAK OF DIPHTHERIA AT CANTERBURY.—An investigation by the sanitary inspector has revealed the fact that there are upwards of sixty polluted wells in the district in which the cases of disease occurred. In every instance the water was contaminated with sewage and swarmed with living organisms."

The LANCET says, June 30, 1883:

"Water is the great carrier of the infective germs. It is the water to which we must look."

LANCET, September 15, 1883.

"All parts of the Thames are polluted with human sewage. The whole Thames, in fact, is at all times polluted with unoxidised sewage matters."

REPORTS of the LOCAL GOVERNMENT BOARD.

"Of 142 epidemics of typhoid fever observed in various localities, in 125 cases the epidemic had no other determining cause than the use of water containing impurities."

APOLLINARIS NATURAL MINERAL WATER

"THE QUEEN OF TABLE WATERS."

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The Pharmaceutical Journal AND Transactions.

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TABLE OF CONTENTS.

	Page
"The Month"	81
Baycuru Root. By F. A. Dalpe	86
The Musk Rat (Fiber Zibethicus). By E. Gregory	87
Pharmacy under Difficulties during a Blockade. By W. A. Strother	88
List of Petitions for Amendment of the Medical Acts Amendment Bill	89
EDITORIAL ARTICLES AND NOTES :—	
Painless Death for the Lower Animals	91
British Pharmaceutical Conference	92
Notes :—Medical Acts Amendment Bill—Notes from Victoria	92
PROVINCIAL TRANSACTIONS :—	
Hawick Pharmaceutical and Chemical Association	93
PROCEEDINGS OF SCIENTIFIC SOCIETIES :—	
Royal Institution of Great Britain :—The Physiological Aspect of Mesmerism. By J. N. Langley (*concluded*)	93
International Health Exhibition :—	
Conference on the Water Supply	97
Conference of Bee-Keepers	99
PARLIAMENTARY AND LAW PROCEEDINGS :—	
Prosecution under the Pharmacy Act—The Pharmaceutical Society of Great Britain *v.* Cooke	100
Answers to Correspondents	100

Pharmaceutical Society of Great Britain.

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

LIBRARY AND MUSEUM

SPECIAL NOTICE.

The Library and Museum will not be open in the evening during August and September.

The Library and Museum will be closed from September 1st to September 13th, both dates inclusive, for revision.

BENEVOLENT FUND.

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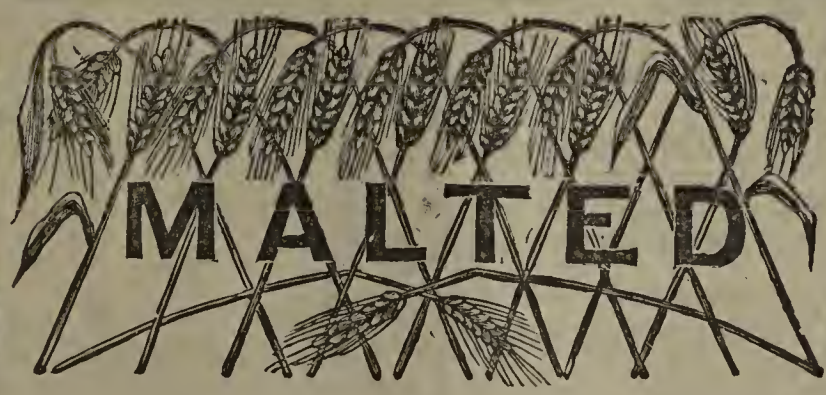
FRY'S  **COCOA**

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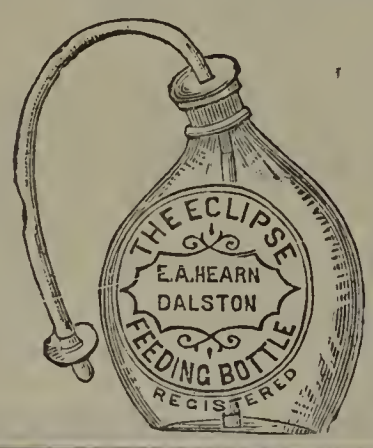

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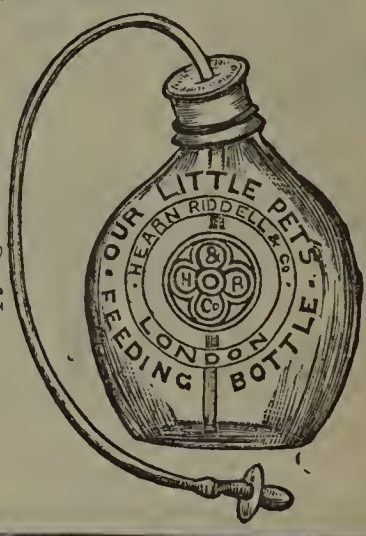

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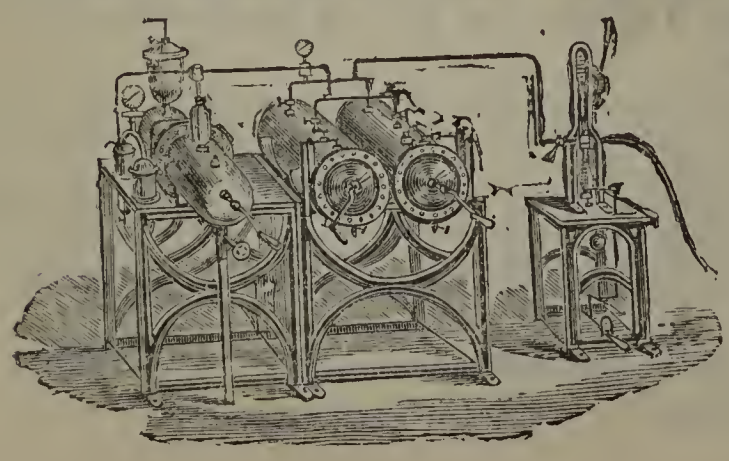

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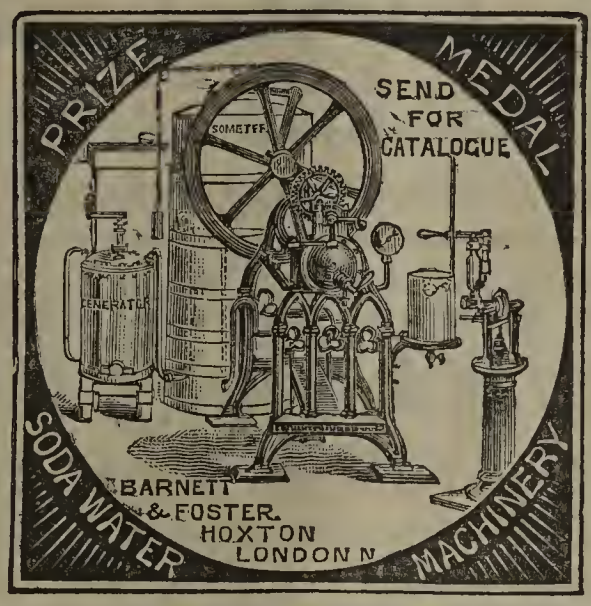

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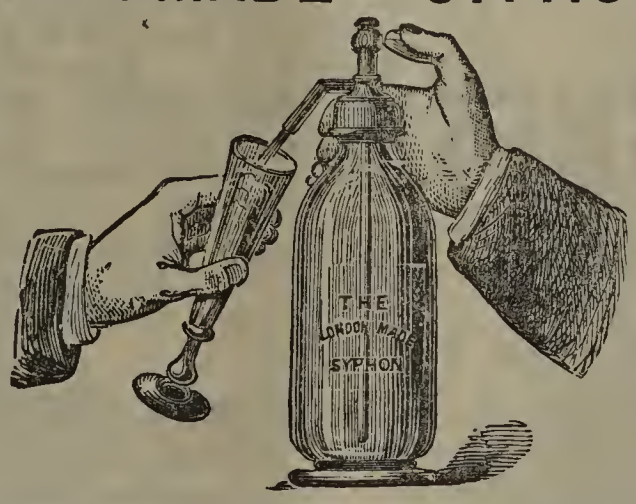

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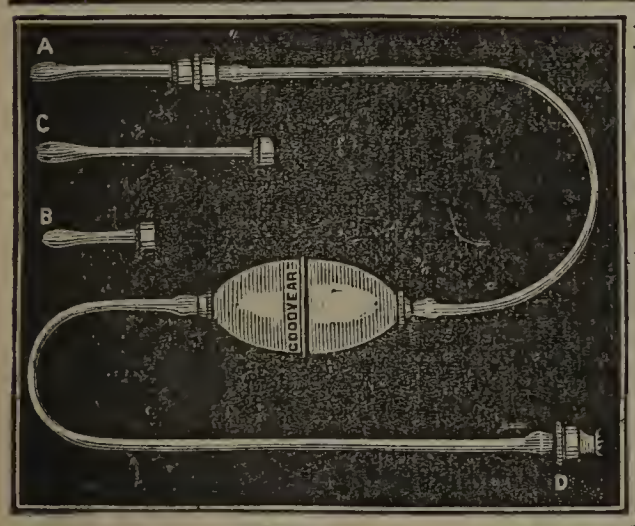

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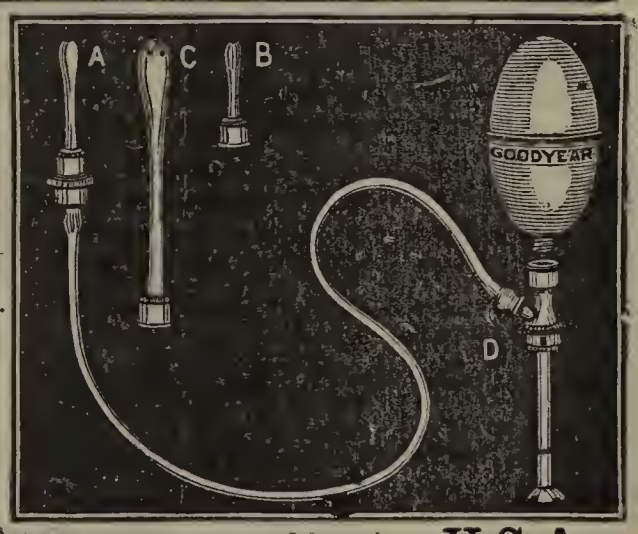

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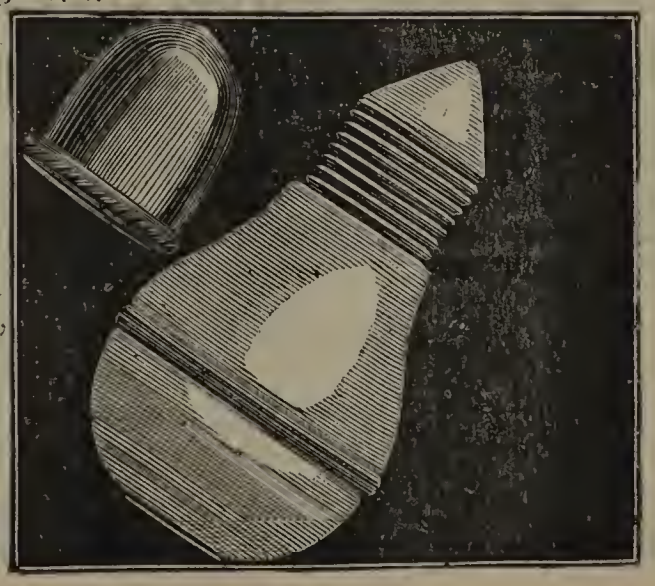

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SPECIAL QUOTATIONS TO WHOLESALE BUYERS.

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"THE MONTH."

In striving to improve upon the conditions under which, by the use of ethylene, Messrs. Wroblewski and Olszewski succeeded in liquefying oxygen so that the meniscus could be observed (*Pharm. Journ.*, [3], xiii., 882), M. Cailletet was led to search for a body having a still lower boiling point, by means of which oxygen might be at once liquefied, without the necessity for using pneumatic apparatus to lower the boiling point of the refrigerating agents. In a communication to the Academy of Sciences (*Comptes Rendus*, xcviii., 1565) he reports that formene, or marsh gas, fulfils this condition. In fact, this gas, under slight pressure and cooled in ethylene boiling under ordinary atmospheric pressure, is resolved into an extremely mobile colourless liquid, which in passing again into the gaseous condition causes a lowering of the temperature sufficient for the immediate liquefaction of oxygen. In this manner the liquefaction of oxygen becomes one of the simplest of laboratory operations.

An important discovery has been made known to the Academy of Sciences, by M. Bourbourze (*Comptes Rendus*, xcviii., 1490), who has found a means of soldering aluminium successfully. Hitherto the great drawback to the extended use of this metal in the arts and in scientific instruments, for many of which it is peculiarly fitted by its great lightness and resonance, has been the difficulty of making good joints. M. Bourbourze uses alloys of tin and zinc, or of tin, bismuth and aluminium; but one of tin and aluminium yields the best results. The proportions of alloy vary with the kind of work it is intended for. For instruments which have to be turned or shaped after soldering an alloy composed of 45 parts of tin and 10 of aluminium is most suitable. This will resist even hammering. Metal which it is desired to solder to aluminium should be first tinned with pure tin.

Triethylamine, $N(C_2H_5)_3$, is a compound the properties of which in reference to water are quite exceptional. It is one of those rare bodies which like sulphate of sodium, sulphate of calcium and caustic lime are more soluble in cold than in hot water. The phenomenon has been recently discussed incidentally by Dr. Guthrie in a communication on "Salt Solutions and Attached Water" (*Phil. Mag.*, July), where the opinion is expressed that it is due to decomposition (in this case of a hydrate), which so often follows increased temperature, and not to an inversion of the rule that solubility increases with the temperature. The slightest rise above the critical temperature or highest point at which a mixture of triethylamine and water is capable of forming a perfect solution is marked by a considerable separation and distinct turbidity, and so delicate is this reaction that the warmth of the hand momentarily applied to a test tube containing such a solution, or the most rapid passage of the test tube through a flame, causes the limpid liquid to become quite milky. Dr. Guthrie has proposed (*Lancet*, July 19, p. 132) to utilize this property of triethylamine as means of taking the temperature of the human body. He suggests that for this purpose solutions varying in strength from 5 to 12 per cent. by weight of triethylamine in water should be enclosed in glass bulbs hermetically sealed. Upon being heated the contents of these bulbs become turbid, those containing the most alkali requiring least heat. A 10 per cent. solution becomes turbid at 72° F., an 8 per cent. solution at 76°, and a 4 per cent. solution requires about 107·6°, so that these and intermediate proportions cover the limits of the range of temperature in the human body.

Referring in the new number of the *Asclepiad* (p. 282) again to the subject of bichloride of methylene, and to certain statements describing it as a mixture, Dr. B. W. Richardson says that as introduced by him it is "a substance sufficiently definite, having a composition of CH_2Cl_2, a vapour density of 42, and a boiling point of 106° F." He describes it as narcotizing with the greatest steadiness, but more readily than chloroform, and says that whilst it belongs to a dangerous family of chemical substances, he believes it to be, from its comparative lightness, safer than chloroform, though probably less safe than ether. He adds that in two instances, where death had been attributed to the use of bichloride of methylene, an examination of the liquid used showed it to be absolute chloroform; whilst in another case a mixture of methylene with some form of ether had been used. Dr. Richardson admits that to manufacture bichloride of methylene on a large scale and at a cost as low as that of ether and chloroform is exceedingly difficult, and may possibly—although not to his knowledge—have led to the introduction of compounds assuming to be methylene bichloride. Some experimental results that have been published as having been obtained with what was supposed to be freshly-made bichloride, Dr. Richardson says had "obviously" nothing to do with the true agent, but were due to the action of some compound containing free chlorine. Not the least interesting point in this paper is the suggestion, supported by illustrations, that not unfrequently deaths which are attributed to anæsthetics are due to syncope arising from fear or other causes; that, in fact, such patients are instances of the class that Dr. Richardson terms the "*morituri.*"

"Japanese belladonna root" (*Scopolia Japonica*) has been the subject of an investigation by Professor Eykman (*Nieuw Tydschr. Pharm.*, May, p. 154), who confirms the results reported by Dr. Langgaard (*Pharm. Journ.*, [3], xi., 10) so far as relates to the presence in it of an alkaloid capable of dilating the pupil of the eye; for this he has adopted the name "scopoleine," and he states that it exercises mydriatic action in a solution of 1 in 5000. This alkaloid appears to belong to the tropeine group, but its exact relation to hyoscyamine, atropine and hyoscine has not yet been made out. It gives Guglielmo's atropine reaction upon heating it with potassium bichromate or ammonium molybdate. The fluorescence observed by other chemists in aqueous extracts of the root appears to be due to a non-nitrogenous body, obtained by exhaustion of the root with chloroform, which has been named "scolopetin." It forms colourless needles or prismatic crystals and is soluble in hot alcohol and boiling water and less soluble in cold water, the aqueous solution having an acid reaction and alcoholic and aqueous solutions showing a strong blue fluorescence. In a second part of the communication (*Nieuw Tydschr. Pharm.*, June, p. 177) Professor Eykman states that scopoletin is the decomposition product of a glucoside, which forms white acicular crystals slightly soluble in cold water, but readily soluble in hot water, alcohol, ether and chloroform. This glucoside has been named "scopolin," and the decomposition it undergoes when boiled with dilute acid is represented by the equation

$$C_{34}H_{30}O_{15}\cdot 2H_2O = 2C_6H_{12}O_6 + C_{12}H_{10}O_5.$$

Scopolin has a narcotic action, but does not dilate the pupil of the eye. Professor Eykman expresses an opinion that *Atropa Belladonna* and other mydriatic Solanaceæ may also contain, besides an alkaloid, a glucoside that has hitherto escaped notice, and the recent discovery by Messrs. Dunstan and Short of a glucoside in nux vomica shows that such an oversight is within the range of possibility.

Twenty years ago Dr. Hübschmann described, under the names "lycoctonin" and "acolyctin," two new alkaloids that he had discovered in the roots of the yellow-flowered *Aconitum Lycoctonum*. Subsequently these compounds were further investigated by Professor Flückiger and others, amongst whom Messrs. Wright and Luff came to the conclusion that they were identical with aconine and pseudaconine, the decomposition products of aconitine and pseudaconitine respectively (*Pharm. Journ.*, [3], viii., 169). The subject has recently been taken up afresh by Messrs. Dragendorff and Spohn, who report (*Ph. Zeit. f. Russl.*, xxiii., 313) that they have found Hübschmann's lycoctonine and acolyctine to be really decomposition products, though not of aconitine and pseudaconitine, but of two hitherto unnoticed alkaloids peculiar to *A. Lycoctonum*, which they have named "lycaconitine" and "myoctonine," and represent by the formulæ $C_{27}H_{34}N_2O_6$ and $C_{27}H_{30}N_2O_8$. Some physiological experiments made by Herr Jacobowsky (Dissertation, Dorpat) appeared to show that lycaconitine is an energetic poison, resembling curare in its action, but not suitable for therapeutic purposes, as it is imperfectly absorbed by the stomach, and under the influence of the secretions passes into a condition in which it is inert.

The American drug introduced under the name of "manaca," or vegetable mercury (*Pharm. Journ.*, [3], xiii., 798), has been submitted to a further chemical investigation by Herr Lenardson (Dissert., Dorpat). The drug examined is described as consisting of pieces of the stem and root of *Franciscea uniflora*, still covered with bark. The two most important constituents appear to be an alkaloidal body, which is represented by the formula $C_{15}H_{23}N_4O_5$ and has been named "manacine," and a fluorescent substance. Manacine is described as a light yellow very hygroscopic powder, having a faint bitter taste and possessing only weak basic properties. It melts at 115° C., and has not yet been obtained in the crystalline form, though it dialyses readily. It is freely soluble in water, and in ethylic and methylic alcohol, but insoluble in ether, benzin, amylic alcohol and chloroform. The solutions are very unstable, that in hydrochloric acid being the most permanent. In concentrated solution it gives with all metallic salts amorphous precipitates that are soluble in water. The alkaloid is poisonous in large doses and is considered to be the active principle of the drug. The fluorescent compound appeared to be identical in every way with gelseminic acid, since it agreed exactly with it in all the principal reactions, except that there was no separation of sugar when treated with caustic alkali or hydrochloric acid; but Herr Lenardson considers this character to have been attributed to gelseminic acid by Messrs. Robbins and Wormley through an erroneous observation. Both the alkaloid and the fluorescent compound were found in the wood as well as the bark.

Herr Fridolin has reported to the Dorpat Naturforscher Gesellschaft the isolation from chebulic myrobalans (*Terminalia Chebula*) of a new organic acid, which he has named "chebulinic acid" and considers to be probably the source of the gallic and tannic acids that had been detected by previous observers in the fruit. He obtains it by saturating an aqueous solution of an alcoholic extract of the fruit with sodium chloride, dissolving the matter that separates in water and shaking the solution with acetic ether, which takes up the chelidonic acid together with tannic acid. The residue after the evaporation of the ether is dissolved in a little water and allowed to stand for a few days, when the chelidonic acid crystallizes out in rhombic prisms. The acid, which is odourless and sweet, dissolves very readily in alcohol and hot water, not so freely in ether, and with great difficulty in cold water, the solutions having an acid reaction. In aqueous solution chelidonic acid reduces Fehling's liquid, and in some of its reactions it closely resembles gallic acid. Herr Fridolin suggests as a formula probably representing its composition, $C_{28}H_{24}O_{19}$. When decomposed by heating an aqueous solution in a closed tube, chelidonic acid takes up the elements of water and the molecule is split up into two molecules of gallic acid and one of tannic acid. Herr Fridolin suggests the possibility of the existence in other instances of an original compound splitting up into tannic and gallic acids.

Messrs. Rizza and Butlerow have submitted asaron, the crystalline constituent of the essential oil of *Asarum europæum*, to a chemical investigation with a view to clearing up its history. They report (*Berichte*, xvii., 1159) that pure asaron melts at 59° C., boils at 296° C., and in small quantities distils without decomposition. It is partially soluble in boiling water, from which it crystallizes on cooling in delicate needles and scales. In alcohol, ether, carbon tetrachloride and acetic acid it is readily soluble. When pure it is odourless, and has only a faintly pungent taste. The authors attribute to it the formula $C_{12}H_{16}O_3$. In a subsequent communication (*Berichte*, xvii., 1415) Professor Poleck confirms practically these results, but adds that pure asaron is remarkably phosphorescent, and states that analyses made in the university laboratory at Breslau render the formula $C_8H_{10}O_2$ probable.

Messrs. Muntz and Marcano have recently examined the so-called mannite found in the avocado fruit, *Laurus Persea*, and found that it differs from the mannite of manna. The formula is $C_{12}H_{14}O_{12}$. It differs from mannite in its fusing point, which is between 183·5° and 184° C., that of mannite being 164·5°. It is very soluble in hot water and alcohol, but less so in cold water (6 in 100) and slightly only in cold alcohol. This new body the discoverers have named "perséite." From dulcite, which has the same fusing point, it is distinguished by not yielding mucic acid when oxidized by nitric acid (*Comptes Rendus*, xcviii., 38).

A communication has been made to the Academy of Sciences by M. E. Grimaux (*Comptes Rendus*, xcviii., 1485) on the existence of a series of colloid compounds to which the prevention of the formation of a precipitate by alkalies in solutions of ferric salts containing glycerine or other polyatomic alcohols and carbohydrates appears to be due. These bodies are coagulable under various conditions; but he has not been able to determine their exact composition, since they are easily decomposed by prolonged washings, leaving only ferric hydrate.

Glycerine, sugar, mannite and erythrite caused the formation of these colloid compounds. Colloid bodies are also produced by the addition of arsenite, arseniate and phosphate of sodium to solutions of perchloride of iron. Potassio-ferric tartrate, as well as the ammonio-ferric tartrates and citrates are colloid compounds.

In a subsequent communication to the Academy (*Comptes Rendus*, xcviii., 1578) M. Grimaux compares the phenomenon of coagulation to etherification. As an illustration he takes the soluble silica obtained by the action of water upon silicate of methyl $Si(OCH_3)_4$, which is the normal hydrate $Si(OH)_4$; or the soluble ferric hydrate formed by the action of water upon ferric ethylate, $Fe_2(OC_2H_5)_6$, which is the normal hydrate $Fe_2(OH)_6$. He suggests that in these cases two molecules of the soluble silica or the ferric hydrate reacting one upon the other, as in the case of acids and alcohols, combine with loss of water, this first condensation giving, in the case of silica, disilicic hydrate, $Si(OH)_3 - O - Si(OH)_3$. This condensation with elimination of water is comparable to etherification, and M. Grimaux states that the analogy furnishes an explanation of what takes place in the coagulation of soluble silica or ferric hydrate. Spontaneous coagulation in the cold is a slow reaction like etherification, and, as a rule, like it is retarded by the presence of much water. According to this theory salts that favour coagulation would act as dehydrating bodies, and this is in accord with some of the results obtained by M. Berthelot in his researches on etherification. M. Grimaux also explains the contraction which gelatinous substances formed by coagulation undergo, by supposing that they pass through a succession of such condensations with loss of water until a definite limit has been reached.

In a recent communication to the Academy of Sciences (*Comptes Rendus*, xcviii., 1523), M. Gautier describes a new method of synthesis of organic nitrogen compounds which has already yielded xanthine and methylxanthine and promises to have an important bearing upon the future of organic chemistry. The investigation was undertaken upon the hypothesis that the cyanhydric group exists in the principal compounds of the uric series and that these compounds themselves behave as centres round which the other radicals of the albuminoid molecules are grouped. The reaction in question depends upon the regulated polymerization of the formic nitrile group—$N(CH)'''$—in the presence of water. A mixture of hydrocyanic acid and water is heated in a tube, together with a little acetic acid added to prevent the liquor becoming ammoniacal, after which the contents of the tube are exhausted with cold water. The residue is again taken up with boiling water, which upon cooling deposits a precipitate that is washed, redissolved in hydrochloric acid, the solution neutralized with ammonia, filtered and heated with acetate of copper. Upon boiling the liquor, a precipitate of a mixture of xanthate and methylxanthate of copper is formed, which is decomposed with sulphuretted hydrogen. The methylxanthine can then be separated from the xanthine by means of boiling water. One phase of the interest of this reaction consists in the fact that according to Herr Fischer (*Pharm. Journ.*, [3], xii., 804) the alkaloid theobromine may be looked upon as dimethylxanthine and caffeine as trimethylxanthine.

Xanthine and methylxanthine present considerable interest from a physiological point of view. Dr. A. Bajinski has found that the former occurs in the urine of children, only when they are suffering from nephritis, and that the quantity of it increases in proportion to the malignity of the attack. The resemblance of methyl-xanthine to theobromine in its chemical composition led him to the examination of tea, in which considerable quantities of guanine, xanthine, and hypoxanthine were detected. Hypoxanthine was found to have a remarkable action upon the heart, causing more active and energetic contractions of that organ, and it appears probable that to this substance the beneficial effect of tea drinking may be attributed (*Nature*, July 3, p. 236).

Crystallized carbolic acid is recommended by Dr. Hager (*Pharm. Central.*, v., 289) as a convenient reagent for the detection of nitrous and nitric acids and their compounds in colourless liquids. In the case of a liquid containing an organic acid, or an alkaline salt, 2 or 3 c.c. are made strongly acid with hydrochloric acid; some crystals of carbolic acid are then added and the mixture is heated to 80° or 90° C. In the absence of nitrogen acids the liquid remains colourless or never becomes more than slightly coloured. If traces of either of these acids are present the liquid at once becomes dark and strongly coloured. The testing of phosphoric acid is effected in a similar way, 1 c.c. of hydrochloric acid being mixed with 2 c.c. of phosphoric acid and the carbolic acid then added. When a crystal of carbolic acid is thrown into pure concentrated sulphuric acid, it at first swims on the surface and then passes into solution without colouring the liquid. But if the sulphuric acid contains a trace of nitric or nitrous acid a coloration takes place, which is red, brown or green, according to the proportion of the contamination, but always dark. If the sulphuric acid contains water it is necessary to heat it to 50° to 70° C.

Messrs. Arnaud and Padé also propose (*Comptes Rendus*, xcviii., 1488) to make use of one of the properties of the alkaloid cinchonamine, discovered by the former in a cuprea bark (*Remijia Purdieana*) for the detection of nitrates. The nitrate of this alkaloid crystallizes with extreme facility and is almost entirely insoluble in acidulated water. The crystals are well defined and easily recognisable. It is proposed therefore, to use it as a test for the presence of nitrates. The hydriodate of cinchonamine being but slightly soluble in water, it is necessary when using this test in a mixture of salts to previously eliminate, by a slight excess of solution of acetate of silver, the hydriodic acid from any hydriodates present, and iodides. In testing for nitric acid or nitrates M. Arnaud prefers to use the hydrochlorate of the alkaloid. He thinks this test may be used to determine certain problems connected with vegetable physiology, such as the formation of nitrates in plant tissue and their circulation and destruction in different parts of the plant. Although the bark yielding cinchonamine seems to be rarely imported, several efforts to obtain a specimen having failed, there might be no difficulty in procuring a supply of the alkaloid if a demand should arise for it, since *Remijia Purdieana*, the plant from which it is supposed to be derived, exists abundantly in South America.

M. Berthelot has lately studied the cause of the presence of nitrates in plants and the part they play in vegetable physiology. In order to ascertain these points several plants have been analysed in various

stages of growth, from the seedling to the time of ripening of seed. His experiments tend to establish the existence of a newly-discovered function of plant tissue, which is probably effected by certain cells acting as a ferment and producing nitric acid as the result of their action, in the same way that cells of fruit play the part of yeast in developing alcoholic fermentation. This function appears to be correlative with the phenomena of oxidation and reduction, which take place in the tissue and in successive conditions in the life of plants. He believes that the presence of nitrates is universal in the vegetable kingdom, and that the stem is the principal seat of their production. The proportion present varies, however, at different periods of vegetation: thus, in the potato it may vary from hardly any to 15 per mille. M. Berthelot hopes to be able to use cinchonamine in his future researches on this subject.

Some light has lately been thrown upon the part played by organic acid in plants. According to Dr. de Vries (*Journ. Mic. Soc.*, iv., 410), malic acid, either free or in the form of malates, is one of the principal vegetable acids causing turgidity in the fruit and stems of plants and is one of the chief agents by means of which potash is absorbed through the root. Other organic acids possess similar powers. In young organs they are found chiefly in combination with salts of potash and at a later period this alkali is replaced by lime. Calcium oxalate, so often found in barks, is regarded by S. Rauner as an excretory product, since he found that it did not disappear from the bark as the new shoots were put out, but was constantly present at all times of the year. Herr Pfeffer has noticed that malic acid is the substance which has the specific power of attracting the antherozoids of ferns and selaginellas into the archegonium, while cane sugar is the substance which attracts the antherozoids of mosses. More than the normal amount of these agents has, however, an opposite effect and repels the antherozoids (*Journ. Micr. Soc.*, iv., 412).

An interesting *résumé* of the recent work on chlorophyll done by Dr. Hansen, the assistant to Professor Sachs, is given in *Nature* (July 3, p. 224) by Mr. MacMunn, and is worthy of perusal by those interested in the subject. Dr. Hansen considers that chlorophyll consists of two colouring matters, a green and a yellow, the relative proportions being 100 of the former to 1 of the latter. They are not combined, but exist side by side in the plant. Both have been obtained in the crystalline state, the green forming spheroidal crystals and the yellow crystallizing in needles. This has been effected by removing the fatty matters accompanying them by saponification and separating the chlorophyll yellow by petroleum spirit, in which it is soluble, while the chlorophyll green is not. The solution of the latter shows a red fluorescence, but that of the yellow shows none.

The continuity of protoplasm in plants is still attracting considerable attention in botanical circles. An interesting article in *Nature* (June 16, p. 182) gives a *résumé* of the history of the subject from the year 1837. Herr Russow, who maintains that in all plants during their entire life the whole of the protoplasm is continuous, says the protoplasmic threads are seen well in *Rhamnus*, *Fraxinus*, *Humulus*, *Gentiana cruciata* and in the bark of *Prunus*, *Quercus*, etc. Threads, however, which contain no granules, but are transparent and homogeneous, are with difficulty rendered visible. His method of examination is to lay the sections to be examined in a solution of 0·2 per cent. of iodine and 1·64 per cent. of potassium iodide in concentrated sulphuric acid. After removal the sections are repeatedly washed and then stained with aniline blue; in some cases they are previously stained with picric acid. Mr. Gardiner, however, considers that the sulphuric acid method is unsatisfactory and that the method of swelling with chloroiodide of zinc and of staining with picric-Hoffmann-blue is in every way more advantageous, since little alteration of structure takes place and the staining with blue is limited to the protoplasm (*Journ. Mic. Soc.*, iv., 405).

The question whether growing plants are injurious to health when placed in a bedroom, is one that has often been discussed. According to Dr. J. M. Anders (*Gardeners' Chronicle*, June 21, p. 814.), who has devoted much time during the last three or four years to ascertaining whether flowering plants exhale ozone, it appears that ozone is rarely found in dwelling rooms except when a number of flowering plants are introduced. Even inodorous plants were found to exhale ozone, although its presence was more easily recognized in the case of odorous plants. Sunshine or strong diffused sunlight is, however, as essential to the production of ozone as it is to the work of assimilation and transpiration.

Those readers who indulge in the "fragrant weed," may be interested to learn that the pipes known in England as "Brierwood" pipes are not made from the root of a brier, but from that of a species of heath, *Erica arborea*. They are made at Sienna and Grosseto, and are exported from Leghorn to France. The roots of the plant are collected on the hills of the Maremma, where the plant grows to a great size. When brought to the factory they are cleansed from earth, any decayed parts being removed, and are then cut into blocks of various sizes by means of a circular saw, the economic cutting up of the wood requiring considerable skill and judgment. The blocks are gently simmered in a vat for twelve hours, during which process they acquire the rich yellowish brown hue for which the best pipes are noted. The blocks are then packed in sacks containing from forty to a hundred dozen each, and are sent abroad, principally to St. Cloud, where they are finished into the well-known Pipes de Bruyère, better known in this country as brierwood pipes (*Gard. Chron.*, June 28, p. 839).

According to a statement published by Mr. C. Ford, Director of the Canton Botanic Garden, the recently discovered new Chinese species of Podophyllum, mentioned in vol. xiv., p. 504, is used in medicine by the Chinese, who attach considerable medicinal value to the plant (*Gardeners' Chronicle*, July 29, p. 76).

A fine specimen of *Podophyllum Emodi* has recently developed ripe fruit in Mr. Ware's nurseries at Tottenham. The fruit is orange red, about the size and shape of a hen's egg, but slightly tapering at the upper end. The specimen is in the possession of the Curator of the Pharmaceutical Society's Museum, and can be seen on application.

In the *Journal of Botany* for July, an interesting paper, with illustrations, is given by Mr. J. G. Baker, on the British daffodils. It is rather singular that one of the forms he mentions, *N. lobularis*, which is said to be common near Tenby, is not now known on the Continent, although it is reputed by the country people in South Wales to have been introduced either by the "Flemings," or the "Spanish Armada."

Mr. J. Britten has a paper in the same journal to prove that *Gagea lutea*, Ker., should be called *G. fascicularis*, Salisb., that name having precedence by three years. Field botanists will be interested to learn that *Lilium Martagon* has been found growing wild in tolerable quantity on the banks of the Wye, in Gloucestershire, along with *Paris quadrifolia*, in aboriginal woods, where the brushwood only is occasionally cleared; that *Trichomanes radicans* has been met with in Donegal, and *Carex ligerica*, a plant intermediate in habit between *C. disticha* and *C. arenaria*, in Norfolk.

In a list of the Economic products exhibited in the Calcutta International Exhibition 1883-4, Dr. G. Watt mentions a curious use of the seeds of *Datura fastuosa*. In order to render liquor more intoxicating the seeds are burned on charcoal under a vessel nverted to catch the smoke, and this vessel is then placed over another containing the liquor (*Gardener's Chronicle*, June 28, p. 839). This appears to be another instance in which, as in opium smoking, either a portion of the active principle is volatilized unchanged, or a product possessing similar properties is formed during combustion.

Some interesting investigations on the physiological properties of different preparations of ergot have recently been communicated to the Physiological Society of Berlin. The preparations used in these investigations were those met with in commerce under the names of "extractum secalis cornuti," "ergotin" from various sources, "ergotinin" and "sclerotinic acid." Ergotin was found to produce a more or less marked increase, according to its purity, in the normal blood pressure, followed by a sinking to the level, whereas sclerotinic acid always produced a fall of the blood pressure, followed by a rise to the normal pressure. The extract combined the properties of these two, the blood pressure first rising then sinking below the normal, and afterwards rising to the normal height or a little above it. Ergotin appeared to give rise to a periodic stimulation of the vagus, but satisfactory evidence of its power as a hæmostatic could not be obtained. Sclerotinic acid, however, possessed this power in an eminent degree, but was found to be very painful as a subcutaneous injection, whereas ergotin is not so. Ergotinin in solution was found to be sometimes inoperative, and at other times uncertain. Ergotin, sclerotinic acid and secale extract were all found to have a decided effect in causing contraction of the uterus. Another step has, therefore, been made in our knowledge of the very difficult subject of the active principles of ergot.

According to Mr. T. S. Wiegand (*Amer. Journ. Pharm.*, xiv., 355) the suffering occasioned from poisoning through contact with the "poison-oak" (*Rhus Toxicodendron*) has, in a great number of cases, been relieved by the use of fluid extract of serpentaria. The remedy is best applied by placing cloths moistened with it upon the affected parts, and two or three applications are said generally to effect a cure. The early application of sodium bicarbonate, either dry or in solution, is also said to have a similar effect.

Some time since M. P. Bert, when examining the poison of the sting of certain hymenoptera, came to the conclusion that the poison was acid, but contained an organic base. This conclusion is now confirmed by M. G. Carlet (*Comptes Rendus*, xcviii., 1551), who finds that the poison is secreted by two glands, one forming an acid, and the other an alkaline liquid, and that these are secreted in such a proportion that the mixture is always acid. In the case of flies poisoned successively with the liquid from the acid and then from the alkaline gland, death took place only after the mixture of the two fluids in the body of the insect.

According to the *Scientific American*, a simple plan of bleaching sponges is to immerse them for a few hours in an aqueous solution of bromine obtained by dropping a few drops of that element into a bottle of distilled water and shaking it. A second immersion in a fresh solution, and a final dip in dilute sulphuric acid and washing with cold water, are said to still further improve their appearance (*New Remedies*, July, p. 123).

It is now pretty well known that the flavour and quality of wine are very much affected by the changes which, under the influence of "false" ferments, take place in the must in the interval—more or less prolonged—between the crushing of the grapes and the period when the true ferment from the exterior of the grape skins has become sufficiently developed to dominate over the others. In applying the results of the researches of M. Pasteur to the manufacture of wine the plan has been tried in Germany of preventing the action of these "false" ferments by sterilizing the grape must and afterwards sowing in it a purified ferment. In order, however, to avoid the operation of sterilization M. Rommier now proposes (*Comptes Rendus*, xcviii., 1594) to add to the grape must some of the wine ferment already in full activity, as he finds by experiment that in this way the vinous fermentation can be set up immediately with sufficient vigour to paralyse the false ferments. In addition, the fermentation then takes place regularly and completely at a relatively low temperature—15° to 22° C.—a point of considerable importance in connection with the manufacture of white wines, in which, for the sake of the flavour, the must separated from the marc is fermented at a low temperature.

The renewed interest which has been excited in the investigations of Dr. Koch in consequence of the outbreak of cholera in the south of France will lend importance to a letter that has appeared in *Nature* (July 17, p. 264) under the recognizable initials of E. K. In this letter it is affirmed that three propositions of Dr. Koch—that the comma-shaped bacillus is the cause of cholera, that the alimentary canal is the exclusive organ by which it enters the system, and that it is killed by acid—are in hopeless contradiction. It is argued that if the third proposition, which is the only one of the three that is based on direct experiment, and quite in accord with what is known of other bacilli, is true, it is difficult to understand how the comma-shaped bacillus passes unscathed through the acid contents and acid secretions of the stomach, since to maintain that in all persons attacked by the cholera the stomach has previously become so deranged that its contents and secretions are not acid is an untenable position.

According to a note in *Comptes Rendus* (July 15, p. 86), there has been discovered near the village of Arana, to the east of Cochabamba, in Bolivia, an immense saline deposit, which according to M. Sau consists of 60·70 parts of nitrate of potassium; organic matter, 8·60; borax and traces of salt and water, 30·70. On dissolving the deposit in boiling water an abundance of pure saltpetre crystallizes out on cooling.

BAYCURU ROOT.*

BY FREDERICK AUGUSTUS DALPE, PH.G.

Baycuru is the vernacular name given to a plant, indigenous to Brazil, natural order, *Plumbaginaceæ*, and probabiy derived from the genus *Statice*. Mr. E. M. Holmes, London, believes it to be *Statice brasiliensis*. Although the *Plumbaginaceæ* do not generally inhabit tropical countries, some do exist there, and Dr. Symes gives some further information in regard to the origin of the plant. "It grows on the shores of the Rio Grande, and imbeds itself more or less in the sand, a number of radical leaves rising from above, and being some five to seven inches in length, by one and a half to two inches in breadth. The flower resembles that of the London pride (*Saxifraga serratifolia*). The whole plant is sometimes covered by the sea, for days and even weeks at a time, dependent on the direction of the winds, there being no tides in that locality. The natives have an unlimited amount of faith in its virtues as an astringent and discutient remedy, in all kinds of enlargements and glandular swellings; externally as a fomentation, and frequently as a vapour. It is also prescribed by the resident physicians, not as a specific, for Dr. Landell has found it to fail utterly, but as a rule it is reliable, both externally and internally, and forms a valuable astringent gargle. The root is used both in the fresh and dry states." As seen in commerce the root is subcylindrical, from six to eight inches in length, and from a half to an inch in width. It has a blackish brown bark externally, is quite knotty and very rough from minute transverse fissures, and also from the removal of the cork in some places. There are also numerous depressions, probably due to shrinkage. For these reasons the root has rather a granular appearance externally. Internally it is reddish brown, and in a section cut transversely shows a rather thick bark, prominent wood-wedges, forming a circle with alternate layers of medullary tissue. The pith occupies about one-fourth of the whole diameter, and shows a few compact cells in its tissue; fracture rough, taste astringent.

Under the microscope the ordinary tissues of the dicotyledonous plants are seen. On a transverse section are seen, first the corky envelope, then the cellular envelope, consisting of six or eight layers of cells; to this is connected the liber or inner layer of bast tissue. The cambium layer follows. The wood appears on the transverse section pentangular. The medullary rays are much broader than the adjoining wood bundles. The shape of the cells of the meditullium varies from irregular quadrangular to pentangular. Air passages are also visible within the wood bundles. On the longitudinal section the elongated wood cells are noticeable, as also cells of the medullary rays. The most characteristic microscopical feature, however, is what appears to be sclerogen cells resulting from secondary deposits. In some cases they seem to be composed of a group of cells and are crystalline in appearance. They are found in the pith and in the inner bark.

The material for the following analysis was kindly furnished by Messrs. Parke, Davis and Co. The plan of analysis, essentially that of Mr. H. B. Parsons, was as follows:

Moisture.—6·48 grams of the finely powdered drug were dried in a suitable vessel at a temperature of about 90° C. until it ceased to lose weight. 5·93 grams remained, showing a loss equivalent to 8·5 per cent. of the drug.

Ash.—Three grams of the drug by gradual incineration, in a weighed porcelain crucible, yielded an ash weighing ·290 gram, equivalent to 9·66 per cent. of the drug, and containing potassium, magnesium, sodium and calcium, in the form of sulphates, phosphates and chlorides, principally sodium chloride.

Benzol Extract.—One hundred grams of the finely powdered drug were placed in a suitable percolator, and after saturating the powder with a portion of the menstruum, and closing tightly, it was allowed to macerate for three days; at the expiration of this time the percolation was allowed to proceed until the drug was completely exhausted. The percolate measured 296 c.c., and on evaporation yielded an extract weighing ·388 gram, equivalent to ·388 per cent. of the drug. The extract was soft, of a dark green colour, and consisted of a soft resin, a trace of wax and colouring matter, It was treated with warm water, filtered, and cooled. A portion of the filtrate tested by Mayer's solution, phosphomolybdic acid, platinic chloride, and other reagents for alkaloids, gave negative results. Another portion boiled with dilute hydrochloric acid, and then neutralized with potassa, gave negative results with Fehling's solution, as a test for glucosides.

Alcohol Extract.—The drug remaining after treatment with benzol was dried, and after maceration exhausted with 80 per cent. alcohol. The percolate measured 620 c.c. An aliquot portion yielded an extract equivalent to 16·4 grams of the whole, or 16·4 per cent. of the drug. The extract was treated with water, and a portion of the filtrate was estimated for tannin with a freshly prepared solution of gelatin and alum. The weight of the tannogelatin precipitate was equivalent to 27 grams of the whole, and estimating 45 per cent. of this as tannin, shows a net result of 12·15 per cent. This tannin produced a green colour with iron salts, was readily precipitable with solution of morphine and tartrate of antimony and potassium, in each case a white precipitate forming. The filtrate recovered from the tannin estimate was acidulated with sulphuric acid, an equal volume of alcohol added, allowed to stand for a time, filtered, washed, evaporated clear of all alcohol, and the acid solution tested for alkaloids and glucosides, with negative results for the latter. With Mayer's solution and phosphomolybdic acid precipitates were obtained. The remaining acid solution was then neutralized with ammonia, and the resulting precipitate shaken with ether in a test tube. The ethereal solution was filtered, evaporated to a small quantity, and failing to show any crystalline products, after standing for a few hours, the evaporation was continued to dryness on a watch-glass. The result, as seen under the microscope, was small feathery crystals. Several efforts were made to isolate an additional quantity of these crystals, and the following process proved successful:—An alcoholic tincture was evaporated to a syrupy consistence, potassa added, and the whole shaken with chloroform. The chloroformic solution was evaporated, the residue treated with a weak acid, filtered, precipitated by ammonia, treated with ether and then with chloroform. The crystals obtained in both cases are completely dissipated on ignition, and gave a red colour with sulphuric acid, which disappeared on heating, and left a tarry-coloured liquid remaining. From these evidences I take this principle to be an alkaloid, for which I propose the name *baycurine*.

The portion of the alcoholic extract insoluble in water, was found to be principally resin. A separate investigation of the resinous bodies was conducted as follows:—An aliquot portion of an alcoholic fluid extract, made from another portion of the drug, was poured into water and allowed to stand for a short time, when two resins were observed, one lighter, the other heavier than water. Their respective weights were in the proportion of ·5 to 1·5, and together yielded an amount equivalent to 1·66 per cent. of the drug. The lighter resin was partly soluble in ether and alcohol, and readily soluble in cold solution of potassa. The heavier resin was sparingly soluble in alcohol, soluble in ether, partly soluble in cold solution of potassa, entirely soluble in hot solution of the same. Both resins were precipitated by normal and by subacetate of lead. Their solutions were amber-coloured, and in each the colour was immediately discharged on the addition of mineral acids.

Cold Water Extract.—The remainder of drug left after the alcohol treatment was dried, and then macerated

* From the *American Journal of Pharmacy*, July.

with water. The filtrate was wine-coloured, and a portion yielded an extract equivalent to 3·66 per cent. of the drug, and was found to be gum principally, and to be precipitated by strong alcohol. No albumen was present.

Boiling Water.—The drug left from the previous treatment was boiled with water for eight hours; the volume of water was kept unchanged. The decoction was dark coloured, had a disagreeable odour, and yielded an extract equivalent to 9·39 grams of the whole, or 9·39 per cent. of the drug. Fehling's test proved the presence of glucose. Gum was found. Negative results were obtained for starch by the usual tests.

Volatile Principles.—One hundred and fifty grams of the powdered drug were placed in a retort and macerated for some days with water, then distilled. The distillate was neutral, dark coloured, astringent, and possessed a very strong, disagreeable odour, so much so that it permeated the whole building in which the operation was conducted. On the surface of the distillate was found a trace of volatile oil, but not in sufficient amount to be collected and examined. The distillate tested for alkaloids gave negative result.

The residue in the retort was then treated with potassa and water, and after standing for some days was again subjected to distillation. The distillate was lighter in colour, not so astringent (after neutralization), and the odour was less penetrating and not so disagreeable as the first distillate. What odour it possessed entirely disappeared on allowing the distillate to stand exposed to the air.

Summary.

1. Moisture	8·5 per cent.
2. Ash	9·66 per cent. sulphates, chlorides and phosphates of sodium, potassium, magnesium and calcium.
3. Benzol extract . .	·388 per cent. resin, wax and colouring matter.
4. Alcoholic extract .	16·4 per cent. alkaloid, tannin (12·15 per cent.), resin (1·66 per cent.).
5. Aqueous extracts .	Infusion 8·66 per cent. gum. Decoction 9·39 per cent. glucose, gum.
6. Volatile principle .	Volatile oil (trace).

THE MUSK RAT (FIBER ZIBETHICUS).*

BY E. GREGORY, LINDSAY, ONT.

About two years ago Mr. Cristiani published an article extolling the fragrant properties of "American musk" and saying at the conclusion that it can be substituted for the more expensive Russian or Tonquin musk. As the musk he alluded to is taken from the so-called musk rat or musquash, which abounds in Canadian waters, and is very common in the numerous lakes and streams near which I reside, it seemed to me desirable that I should collect all the information I could obtain about the habits of this little animal, and about the properties and probable utility of the musk it produces.

In front of me as I write are the beautiful waters of Sturgeon Lake, stirred into life and motion by a strong south-west wind. The shore on which I have camped is low, but covered with hardwood to the water's edge. Sturdy oaks predominate, but not far off is a magnificent grove of maple. The lovers of fruit will also find in the neighbourhood choke-cherries, wild plums, gooseberries, raspberries, blackberries and also a few whortleberries and cranberries. The opposite shore, about three miles off, is also low, dotted with farm houses and clearings, and having a stony beach, covered with drift wood. Down this lovely water, some two hundred years ago, swept Count Champlain, leading a band of Indians to attack a settlement of their brethren of a different tribe, who lived on the shores of the lake which now bears his name. Into Sturgeon Lake run several small streams and rivers. About forty years ago, for purposes of navigation and to give water power, a dam was built at the outlet, which, raising the water, had the effect of covering a great deal of low land on each side of the creeks and rivers. The trees were all killed by the excess of moisture, and their dead trunks and branches left standing give the place so weird a look, that it has been named the "drowned land." This and kindred localities are favourite haunts of the musk rat, and here in some pool, amongst the dead and decaying logs, he builds his nest. It is two, and sometimes three feet high, of a roundish conical shape, something like an earthen bowl inverted, and is composed of pieces of stick, weeds and dried leaves. The inside is commodious, and is warm, comfortable and soft. There are two apertures, an entrance and an exit, and they are differently built. Both terminate under the water, so that the animal has to dive both in leaving and returning to his nest. The entrance is built as a gradual slope up to the floor of the lodge, so that he can easily run up it, but the exit is a precipitous descent down which he must jump into the water. In this nest he stays all day long, leaving it to search for food in the night or early grey of the morning. In summer he sometimes burrows in the bank. Occasionally a rat more venturesome than his fellows may be seen swimming a stream in broad daylight, but this is not common. The musk rat is amphibious, and spends a great deal of his time in the water, but commonly has only one method of leaving or returning to the bank. At the edge of every body of water are numerous fallen trees, the ends of which rest on the bank, and the other extremities under water. He chooses one of these as his pathway, swims to it, runs up to the bank, gets what he needs, and returns down the same log again. This habit is taken advantage of for his destruction. Sometimes in the early evening the trapper goes in his canoe with his axe and his traps, and, having discovered by marks best known to himself which log his prey has chosen, he cuts out a chip just below the water's edge, and in its place puts a trap, with two murderous steel jaws, but no teeth, for fear of injuring the fur. Over this trap the poor rat must go both in leaving or returning to the water, and he is thus nearly sure to step into it. These traps are visited night and morning. The fur is the part of the animal desired, and the rest of the carcase is thrown away as a general rule, but is sometimes eaten. The hunter gets from eight to fifteen cents for each skin according to the scarcity of the commodity, or the demands of fashion, and many a fine seal-skin set is in reality nothing but dyed musk rat. I said that the carcase was eaten occasionally. This occurs principally in winter, the flesh being out of season in the summer. I have myself eaten it in the latter part of September, but the dish was insipid. With the Indians, however, it forms a constant article of diet at their winter feasts. The musk sacs are placed in pairs, one on each side of the genital organs, and connected by a cord passing in front. They are underneath the external skin. All summer long and far into the fall these sacs are very small, but towards spring they increase in size, and about the months of February and March they attain their largest size, and strongest odour. I have, indeed, been shown some, very small and useless, said to be the product of the female, but other trappers have contradicted this, and so the matter is doubtful. About a year and a half ago, in the latter part of March, I obtained from a hunter half a dozen of the recent sacs. They ranged from three-quarters of an inch to two inches in length, by about an inch in breadth, were similar in shape to the well-known sacs of beaver castor, but were of a light colour, somewhat like the white meat of a chicken. They were filled, apparently, with an oily fluid, of a strong musky colour, but which had a putrid smell. Being very busy I hung them in the sunny window of a warehouse to dry, where they were allowed to remain about two months, but though they filled the room with their

* From the *Canadian Pharmaceutical Journal*, July.

musky odour, the putrid smell remained, and they never completely dried. At the end of that time they were cut up, and found still to contain an oily fluid, and much membrane, but nothing at all approaching in appearance to grain musk. The putrid smell never left them. Maceration in diluted alcohol extracted the odour and a passable perfume was obtained. But the putrid taint still lingered, and I scarcely consider the experiment a success. Perhaps it would be possible, by a more careful method of drying, to avoid the odour of decay, and if that can be managed, I think a very agreeable perfume might be extracted.

The little animal from which this product is obtained is not truly a rat, nor does it belong to the same family—*Muridæ*, but is more nearly allied to the beaver—*Castor fiber*, whilst the musk rat is *Fiber Zibethicus*. It is much larger than the common rat, and its fur is reddish brown, and quite long. Its tail is round, but slightly flattened at the end, and it is said he steers with it. Its two hind feet are webbed, and its front ones partially so. It lives on the roots and young bark of trees and shrubs, being very fond of the root of the water lily. It is capable of being tamed. A friend, some years ago, had three or four running about the house like kittens, completely domesticated. Trappers describe them as a very clean animal.

There are three other animals also going by the name of musk rat, which might possibly furnish a fragrant musk. These belong to the family of the Shrews, and have the upper lip elongated into snout, or short proboscis. Two are species of the Mygale—one a native of the Pyrenees and the other of the south of Russia ; and a third called the Sondeli, is a native of India, which often utterly spoils provisions through the persistency and strength of its odour.

Some portion of the foregoing is from personal observation, but a great deal from conversation with trappers. But as I have taken some pains in comparing different statements, I think I have not been deceived.

PHARMACY UNDER DIFFICULTIES DURING A BLOCKADE.*

BY W. A. STROTHER.

It may be interesting to some of my contemporaries, and possibly instructive to some of the younger members, to recite briefly a few of the many difficulties we laboured under during the war of secession in the United States. It is not easy to any but those who passed through those stormy times to realize our then situation. Now we are at peace with the world, and the markets of every clime are open to us. Science, energy, business acumen, and the research of the learned are placing formerly hidden treasures in our very hands; the inventive genius of man has been taxed to the uttermost, and each succeeding month gives birth to new remedies and appliances in the healing art. At the time of which I speak we were blockaded, our ports sealed and guarded as to foreign commerce, and by land a cordon, military and strict, prevented any commercial intercourse with the Northern States. So we were all, in every department, thrown on our own resources. On my return from the army, I found the "cream," so to speak, of my stock gone. It had been given up freely and cheerfully to supply the hospital demands, and I only had a beggarly show of empty bottles. Paregoric was out and some had to be made. I had all the necessary factors except benzoic acid. This could not be bought, so it had to be manufactured. How? "Necessity is the mother of invention." I had gum benzoin to start with, an old Confederate frying-pan made a substitute for the retort, over this was closely pasted filtering paper filled full of pin-holes. An old pasteboard hat-box was the receiver. With these rude makeshifts my benzoic acid was made, and for once I was happy.

Nitrate of silver was soon in demand. An artist friend in Richmond, and in the employ of the Government, wrote me he must have some. Fortunately, I had several carboys of different acids, and silver was not very hard to procure ; indeed, every article, from a silver button to a solid salver weighing some 10 pounds, found its way into the greedy maw of nitric acid. But again, the appliances of the laboratory were wanting. One single half-gallon evaporating dish was all I had and I soon found this article was beyond all price. For many months it was true and loyal, doing double duty as a vessel, both for solution and crystallization. The silver, as picked up wherever I could find it, was very impure. This was first dissolved in equal parts of nitric acid and water, then, with a saturated solution of salt, precipitated as a chloride, then carefully washed until all impurities were gone, reduced by zinc to metallic silver, redissolved, filtered and crystallized. But the hospital soon demanded lunar caustic. Where were the moulds to come from ? I drew a plan, and after much persuasion, a gunsmith undertook the manufacture of the moulds. But first the brass plates had to be moulded, and the foundryman said he had not time to make the pattern, and even if he had the pattern, had no brass with which to cast the plates. Fortunately I remembered that an expert in pattern making was then living in Lynchburg, and he kindly made the pattern. Then I hunted up some old brass, and after much delay and begging the plates were cast ; the gunsmith did his part well, and you have before you the self-same lunar caustic moulds.

But a new difficulty presented itself. I had nothing in which to fuse the crystals. As stated before, I had but one evaporating dish, and I feared to risk this. So, after writing to every city and town in Virginia, I at last procured a 4 ounce porcelain capsule, for which I paid the moderate sum of 40 dollars. A pair of pincers made of wood, one blade concave and one convex to fit the curved surface of the capsule, formed the handle, and very soon lunar caustic was produced in sufficient quantity to meet the demand. Bad as were the times, we Confederates still tried to keep up appearances. Grey hair had to be turned to black, and our friend, Dr. Hugh Blair, used much of this nitrate of silver in the preparation of his most excellent hair dye.

To the pharmacist of the present day the idea of making Epsom salts must be amusing. An article costing now less than two cents per pound, sold during the latter days of the Confederacy at ten dollars per pound, and was scarce at that price. A large case of slightly damaged carbonate of magnesium, sulphuric acid, and water, an old tub and an evaporating kettle formed the outfit. The dilute acid was saturated with the magnesia, strained, evaporated, and the next day a handsome crop of crystals was the result. Sulphate of copper and sulphate of iron were also made in pretty much the same way. Skin diseases were at one time an epidemic. Red precipitate was in demand, and must be produced. Nitric acid and mercury were on hand, and that same old Confederate frying-pan was again, by necessity, made to do duty as a crucible, and the nitric acid and mercury were in this way reduced to the red oxide.

It would consume too much valuable time to go into further details. Almost every chemical in every-day use was in some way or other produced—some very crudely, it is true, but sufficiently pure for all practical purposes. Mr. John W. Goodwyn, formerly of Petersburg, and our worthy ex-President, T. Roberts Baker, were then stationed in Lynchburg, and rendered me most valuable assistance from time to time. The moral of this paper, if it has any moral, is to teach the young pharmacist that much may be accomplished by study and perseverance, not to rely entirely on the manufacturer and wholesaler, but to be ready to meet any emergency that may arise, and to be prepared by actual experience to manufacture any article that may be suddenly called for, which he may be temporarily out of.

* A paper read at the third annual meeting of the Virginia State Pharmaceutical Association. Reprinted rom the *Weekly Drug News*, July 5.

THE POSITION OF PHARMACISTS IN RELATION TO THE PHARMACOPŒIA.

The following is a continuation of the list of petitions, with the number of signatures to each, presented to the House of Commons in favour of an alteration of the Medical Acts Amendment Bill in the direction desired by the Council of the Pharmaceutical Society. It is compiled from the official report of the Select Committee on Public Petitions, and gives presentations from the 7th to the 22nd of July inclusive.

July 7.

	Signatures.
Pharmaceutical Chemists and Chemists and Druggists of Newport, in the county of Monmouth (*Mr. Frederick Morgan*)	14
— Hull (*Mr. Norwood*)	45
— Hull (*Mr. Norwood*)	25

July 9.

Medical Practitioners of Eye (*Mr. Ashmead-Bartlett*)	2
— Blackburn (*Mr. Coddlington*)	19
— Newcastle-upon-Tyne (*Mr. Cowen*)	21
— Leek (*Mr. Craig*)	4
— Cheltenham (*Baron de Ferrieres*)	11
— Chippenham (*Mr. Goldney*)	4
— Rye (*Mr. Inderwick*)	3
— Malmesbury (*Mr. Miles*)	4
— Newark (*Mr. Newzam Nicholson*)...	6
— Hawick and other places (*Mr. Trevelyan*) ...	14
— Louth (*Mr. Rowland Winn*)	3
— Stoke-on-Trent (*Mr Woodall*)	8

Pharmaceutical Chemists and Chemists and Druggists of Eye (*Mr. Ashmead-Bartlett*)	2
— Leeds (*Mr. Barran*)	27
— Falmouth (*Mr. Brett*)	4
— Kidderminster (*Mr. Brinton*)	9
— Blackburn (*Mr. Coddington*)	22
— Newcastle-upon-Tyne (*Mr. Cowen*)	34
William Mort and others (*Sir Richard Cross*) ...	3
Pharmaceutical Chemists and Chemists and Druggists, Southport (*Sir Richard Cross*)	18
— Cheltenham (*Baron de Ferrieres*)...	31
H. R. Sherrard and W. H. Reed (*Mr. Glyn*) ...	2
Pharmaceutical Chemists and Chemists and Druggists, Shaftesbury; Frederick Barry (*Mr. Glyn*)	1
— Chippenham (*Mr. Goldney*)	4
Chemists and Druggists of Hexham (*Mr. Albert Grey*)	4
— Diss (*Mr. Gurdon*)...	5
— Bradford (*Mr. Illingworth*)	27
— Rye; H. W. Smith; W. A. Waters (*Mr. Inderwick*)	2
— Spalding (*Mr. Compton Lawrance*)	7
— Malmesbury (*Mr. Miles*)	9
— Newark (*Mr. Newzam Nicholson*)...	11
— Westbury (*Mr. Pickering Phipps*)	5
— Cardiff (*Sir Edward Reed*)...	19
— Hawick and other places (*Mr. Trevelyan*) ...	11
— Louth (*Mr. Rowland Winn*)	9
— Stoke-on-Trent (*Mr. Woodall*)	8
John Dexter Sutton and others	9

July 10.

Medical Practitioners of Darlington (*Mr. Theodore Fry*)	11
— Poole (*Mr. Harris*)	6
— Perth (*Mr. Parker*	12
— Aylesbury (*Mr. George Russell*)	2
— South Norwood (*Mr. Watney*)	7
— Tunstall (*Mr. Woodall*)	12

	Signatures.
Pharmaceutical Chemists and Chemists and Druggists of Morpeth and Blyth (*Mr. Burt*) ...	7
— Andover (*Mr. Buxton*)	4
— Margate (*Mr. Akers-Douglas*)	10
— Notting Hill (*Mr. Firth*)	27
— Darlington (*Mr. Theodore Fry*)	13
— Bishop Auckland (*Mr. Theodore Fry*)	6
— Clapham (*Mr. Grantham*)	14
— Wareham (*Mr. Guest*)	4
— Macclesfield (*Mr. Hopwood*)	12
— Holloway, N. (*Sir Andrew Lusk*)	18
— Sheffield (*Mr. Mundella*)	50
— Perth (*Mr. Parker*)...	12
— Carnarvon (*Mr. Rathbone*)...	4
— Aylesbury (*Mr. George Russell*)	3
— South Norwood (*Mr. Watney*)	12
— Liverpool (*Mr. Whitley*)	22
— Burslem (*Mr. Woodall*)	14

July 11.

George H. Kinch and Thomas Horne, Medical Practitioners of Sandwich (*Mr. Henry Brassey*) ...	2
Medical Practitioners of Doncaster (*Mr. H. W. Fitzwilliam*)	12
Edwin J. Hunter, L.R.C.P.E., Gosport (*Sir Frederick FitzWygram*)	1
Medical Practitioners of Kingston and Surbiton (*Sir Trevor Lawrence*)	6
— Yeovil (*Mr. Richard Paget*)	13
— Huntingdon (*Sir Robert Peel*)	5

Chemists and Druggists of Sandwich (*Mr. Henry Brassey*)	4
— Birmingham (*Mr. Chamberlain*)	93
— Doncaster (*Mr. H. W. Fitzwilliam*)	8
— Gosport (*Sir Frederick FitzWygram*)	8
— Berwick (*Lieutenant-Colonel Home*)	7
— Leighton-Buzzard (*Mr. James Howard*)	7
— Leeds (*Mr. Jackson*)	14
— Kingston-on-Thames (*Sir Trevor Lawrence*) ...	11
— Yeovil (*Mr. Richard Paget*)	9
— Huntingdon and other places (*Sir Robert Peel*) ...	9
— Tavistock (*Lord Arthur Russell*)	5
— Bridlington Quay (*Mr. Sykes*)	10

July 14.

Medical Practitioners residing in Elgin and Forres (*Mr. Asher*)	9
F. Hawthorn and W. J. H. Fletcher, Medical Practitioners residing in Uttoxeter (*Mr. Bass*) ...	2
Medical Practitioners residing in Buxton (*Lord Edward Cavendish*)	9
— Evesham (*Mr. Dixon-Hartland*)	2
— Aberdeen (*Dr. Farquharson*)	20
— Carlisle (*Mr. Ferguson*)	18
— Boston (*Mr. James Lowther*)	3
— Hull (*Mr. Norwood*)	20
— Kilmarnock (*Mr. Dick Peddie*)	6
— Edinburgh (*Sir Lyon Playfair*)	15
— Edinburgh (*Sir Lyon Playfair*)	10
Walter Wearne, M.R.C.S., and C. F. Bullmore, M.R.C.S., Medical Practitioners of Helston (*Mr. St. Aubyn*)	2
Medical Practitioners of Congleton (*Mr. Warburton*)	5

	Seal.
Members of the Pharmaceutical Society of Ireland (*Mr. Gibson*)	2

	Signatures.
Members of the Pharmaceutical Society residing in Glasgow (*Mr. Anderson*)	12
— Glasgow (*Mr. Anderson*)	17
— Glasgow (*Mr. Anderson*)	8
— Elgin and Forres (*Mr. Asher*)	8
— Manchester and elsewhere (*Mr. Jacob Bright*) ...	112

	Signatures.
Pharmaceutical Chemists and Chemists and Druggists residing in Buxton (*Lord Edward Cavendish*)	8
— Evesham (*Mr. Dixon-Hartland*)	4
— Kensington (*Mr. Firth*)	28
— Bristol and Clifton, and others (*Mr. Lewis Fry*)...	67
Chemists and Druggists of Boston (*Mr. James Lowther*)	10
— Truro (*Sir J. M'Garel-Hogg*)	6
— Brighton (*Mr. Marriott*)	50
— Kilmarnock (*Mr. Dick Peddie*)	3
Richard H. Groves and Samuel Griffith, Chemists and Druggists of Blandford (*Mr. Portman*) ...	2
C. Wakeham and M. W. Troake, Chemists and Durggists of Helston (*Mr. St. Aubyn*)	2
Chemists and Druggists of Congleton (*Mr. Warburton*)	8
Thomas Robson and others	3

July 15.

Members of the Northern Counties' Branch of the British Medical Association, in meeting assembled; Duncan MacIntyre, M.D., President (*Mr. Asher*)	1
Medical Practitioners of Horsham (*Sir Walter Barttelot*)	3
— Barnstaple (*Sir Robert Carden*)	8
— Strawberry Hill, S.W. (*Mr. Cohen*)	3
— Tiverton (*Viscount Ebrington*)	6
— Ripon (*Mr. Goschen*)	6
Pharmaceutical Chemists and Chemists and Druggists of Horsham (*Sir Walter Barttelot*) ...	8
— Barnstaple (*Sir Robert Carden*)	13
— Southwark (*Mr. Cohen*)	59
— Tiverton (*Viscount Ebrington*)	6
— Ripon (*Mr. Goschen*)	6
— Sunderland (*Mr. Gourley*)	38
— Lambeth (*Sir William M'Arthur*)	14
— Aberdeen (*Dr. Webster*)	20

July 16.

Medical Practitioners of Denbigh (*Sir Robert Cunliffe*)	3
— Nuneaton (*Mr. Newdegate*)	9
— South Shields (*Mr. Stevenson*)	9
Richard Jones, a Medical Practitioner at Flint (*Mr. Roberts*)	1
Chemists and Druggists of Denbigh (*Sir Robert Cunliffe*)	5
— Nuneaton (*Mr. Newdegate*)	10
Michael Jones and Owen William Jones, Chemists and Druggists of Flint (*Mr. Roberts*)	2
Chemists and Druggists of High Wycombe (*Mr. Samuel Smith*)	4
— South Shields (*Mr. Stevenson*)	16
— Newbury (*Mr. Walter*)	5

July 17.

Pharmaceutical Chemists and Chemists and Druggists in Lewisham and Deptford (*Baron Henry de Worms*)	11
— Carlisle (*Mr. Ferguson*)	17
— Accrington (*Mr. Grafton*)	12
— Stroud and other places (*Mr. Stanton*)	8

July 18.

Medical Practitioners of Maldon (*Mr. Courtauld*) ...	4
— Camberwell and other places (*Mr. Daniel Grant*)	11
Hugh Davies, M.R.C.S., L.S.A., and other Medical Practitioners of London and elsewhere (*Mr. Daniel Grant*)	6
Medical Practitioners of Totnes (*Sir Massey Lopes*)	4
— Woodbridge (*Lord Rendlesham*)	3

	Signatures.
Pharmaceutical Chemists and Chemists and Druggists of Maldon (*Mr. Courtauld*)	3
Members of the Bud of Hope Lodge of the Independent Order of Odd Fellows, Bradford, in the county of York (*Mr. Forster*)	3
Pharmaceutical Chemists and Chemists and Druggists of London (*Mr. Daniel Grant*)	26
— London (*Mr. Daniel Grant*)	37
— Darwen (*Lord Hartington*)	3
— Northampton (*Mr. Labouchere*)	11
— Totnes (*Str Massey Lopes*)	4
— Woodbridge (*Lord Rendlesham*)	5

July 21.

Medical Practitioners of Tenby (*Mr. Henry Allen*)...	4
— Pembroke (*Mr. Henry Allen*)	6
— Bow (*Mr. Bryce*)	10
— Tunbridge Wells (*Sir William Hart Dyke*) ...	6
— Eastbourne (*Mr. Gregory*)...	12
— the city of Worcester (*Mr. Staveley Hill*) ...	13
— Kemerton and Tewkesbury (*Mr. R. Biddulph Martin*)	3
— Hereford (*Mr. Pulley*)	5
— Burnley (*Mr. Rylands*)	11
— Hythe (*Sir Edward Watkin*)	3
Pharmaceutical Chemists and Chemists and Druggists of Pembroke (*Mr. Henry Allen*)	5
— Tenby (*Mr. Henry Allen*)	3
— Bow and other places (*Mr. Bryce*)	15
— the city of London (*Mr. Cotton*)	24
— Ramsgate (*Mr. Akers-Douglas*)	12
— Tunbridge Wells (*Sir William Hart Dyke*) ...	14
— Camberwell and Peckham (*Mr. Grantham*) ...	12
— Streatham (*Mr. Grantham*)	4
— Eastbourne (*Mr. Gregory*)...	16
— Worthing (*Mr. Loder*)	6
— Tewkesbury (*Mr. R. Biddulph Martin*)	4
— Hereford (*Mr. Pulley*)	12
— Burnley (*Mr. Rylands*)	13
Chemists and Druggists of Hythe (*Sir Edward Watkin*)	2
Pharmaceutical Chemists and Chemists and Druggists of Bath (*Mr. Wodehouse*)	12

July 22.

Medical Practitioners of Abingdon (*Mr. J. Creemer Clarke*)	5
— Richmond, in the county of York (*Mr. Dundas*)	4
— Coventry (*Mr. Eaton*)	16
— Rhyl (*Lord Richard Grosvenor*)	8
— Holloway and neighbourhood (*Sir Andrew Lusk*)	12
— York (*Sir Frederick Milner*)	6
Members of the Executive Committee of the Chemists and Druggists' Trade Association of Great Britain, in meeting assembled; T. M. Harrison, President; W. F. Haydon, Secretary (*Mr. John Bright*)	2
Pharmaceutical Chemists and Chemists and Druggists of Hyde (*Mr. W. Cunliffe Brooks*)... ...	8
— Abingdon (*Mr. J. Creemer Clarke*)	7
— Watford (*Mr. Cowper*)	5
— Kendal (*Mr. Cropper*)	10
— Thirsk (*Mr. Dawnay*)	5
— Richmond, in the county of York (*Mr. Dundas*)	4
— Coventry (*Mr. Eaton*)	22
— Rhyl (*Lord Richard Grosvenor*)	6
— Holloway and neighbourhood (*Sir Andrew Lusk*)	11
— York (*Sir Frederick Milner*)	30
— Stroud Green, N., and neighbourhood (*Mr. Torrens*)	8
— Hanley (*Mr. Woodall*)	6

The Pharmaceutical Journal.

SATURDAY, AUGUST 2, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

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PAINLESS DEATH FOR THE LOWER ANIMALS.

WHATEVER may be the cause, there can be very little doubt that the last two or three decades have been marked by a considerable development of public opinion antagonistic to toleration of the infliction of any unnecessary suffering upon the brute creation. Whether this is to be attributed to an excess of sentimentality attending an advanced civilization, or is to be considered a legitimate outgrowth of that love for "all things both great and small," which, according to COLERIDGE, marks the truly devout man, we do not pretend to say, or indeed whether it may not have arisen from a mixture of both causes. Our object in referring to the subject on the present occasion is to quote a few details from an interesting paper in the new number of *Asclepiad* dealing with one phase of it, concerning which appeals have not unfrequently been made to the physiologist and chemist. In this communication, under the graphic title of "Euthanasia for the Lower Animals," Dr. B. W. RICHARDSON summarizes the results of researches, extending over about thirty years, having for their object the mitigation of animal suffering in the shambles and in other circumstances where it is necessary or desirable that members of the brute creation should be deprived of life. In entering upon this investigation, Dr. RICHARDSON recognized that the object to be attained was the contrivance of a method of depriving animals of life that should be at the same time inexpensive, simple, easy and safe to carry out, rapid and decisive; it was also a necessity where the animals killed were intended for use as food that the operation should not interfere with the flow of blood from the animal or communicate an unnatural odour or taste to the flesh.

The two methods that were made the subject of experiment, as apparently specially applicable, were the electric shock and the administration of a narcotic vapour. The electric shock, however, had early to be eliminated from the list of possible methods, because it did not comply with some essential requirements. It was found that whilst there was no difficulty in causing the instantaneous death of an animal, yet in such case the animal would not afterwards bleed, a *sine quâ non* from the butcher's point of view; whilst if the shock were reduced so as not to be immediately decisive, the animal, upon a flow of blood being set up, showed signs of returning consciousness. Moreover, the operation was dangerous to the slaughtermen as well as to the animals, unless carried out with more care than could be expectedal ways from ordinary workmen. The electric method having failed in practice, the investigation was continued in the direction of inducing by the inhalation of narcotic vapour insensibility to the pain of death, which should then be caused by the ordinary operation of bleeding. Four of the more familiar agents—nitrous oxide, carbonic dioxide, sulphuric ether and chloroform—were soon excluded from consideration. The first two produced convulsive action and darkened the flesh; ether was too slow and communicated its odour to the flesh, whilst chloroform was open to the same objections unless administered in such quantity as to paralyse the heart and kill the animal. Three other compounds were, however, found quite effectual for the purpose, namely, a mixture of hydride of amyl and methylene bichloride diffused by coal-gas; a mixture of carbon disulphide and methylene bichloride diffused by coal-gas; and chloroform diffused by coal-gas. These vapours proved to be very rapid in their action: two drachms of the liquid poured upon a layer of flannel in an inhaler through which a current of coal-gas was made to pass and applied to the nostrils was sufficient to produce the required amount of narcotism in sheep in from eighty to one hundred seconds. As a rule the inhalation took place without any struggle, the animal passing into a gentle and deep sleep. Upon "killing" the animal, while in this condition, in the usual way by dividing the vessels of the neck, there was no indication of pain, and after a moment's hesitation the blood flowed freely. When warm-blooded animals are slaughtered under ordinary conditions by causing loss of blood death is invariably preceded by two series of convulsions, which Dr. RICHARDSON terms the primary, or syncopal, and the secondary, or fatal. These convulsions occur in definite order and mark the changes caused by the loss of certain proportions of blood. But in death from hæmorrhage during the insensible condition produced by a narcotic vapour it has been observed that the primary convulsion is either suspended altogether or much reduced in force; whilst the secondary convulsion, although always occurring, is less severe than under the usual conditions. The cost of the anæsthetics was merely nominal.

Notwithstanding the favourable results obtained with the compounds mentioned, some subsequent researches in connection with the anæsthetic action of the fumes of the common puff-ball, *Lycoperdon giganteum*, which was ascertained to be due to carbonic oxide, induced Dr. RICHARDSON to experiment with that compound from the "euthanasia" point of view. The consequence has been that, to use his own words, he "in the course of time employed it

"as one of the cheapest and readiest of the lethal "gases for the painless extinction of life in the "lower creation, using it frequently for narcotizing "sheep, birds and dogs." We do not gather from this that the gas has yet found practical application in the slaughter house for the purpose which was the primary object of the investigation. Indeed, in respect to its applicability to oxen, Dr. RICHARDSON himself appears to have some doubt. But in another direction it seems to have been utilized to a considerable extent. In connection with the "Dogs' Home," at Battersea, a lethal chamber has this year been constructed, capable of holding nearly a hundred dogs at once, in which already five hundred animals that had of necessity to be destroyed have been made to sleep into death. The carbonic oxide required for charging this chamber is generated by the combustion of charcoal in a special stove, and the current of gas on its way to the chamber is made to take up some vapour of methylated chloroform containing bisulphide of carbon. One point that appears to have been established in these operations, is that the idea that an atmosphere charged with five per cent. of carbonic oxide is instantaneously fatal to warm-blooded animals is a fallacy, as some continue to live for a long time in an atmosphere containing five times that proportion of the gas. Moreover, all animals after they have fallen into deep sleep under the influence of the gas do not pass into death with equal rapidity, about three per cent. showing a great tenacity of life. As a rule, however, under the conditions maintained in the lethal chamber at Battersea, the supreme event is induced very rapidly.

BRITISH PHARMACEUTICAL CONFERENCE.

WE are informed by the Honorary General Secretaries that the following is a complete list up to date of papers promised for the Hastings meeting. As we have already published in a recent number an account of the general arrangements, we need only briefly state that the meeting will take place in the Assembly Rooms, Castle Hotel, commencing at 10.30 a.m. on the 12th of August; that besides the business proceedings on the 12th and 13th there will be a dinner on the evening of the 13th at the Castle Hotel; and that there will be an excursion on Thursday the 14th to Battle Abbey, the Sub Wealden or Gypsum works, Normanhurst and Ashburnham.

1. A Report on English Rhubarb. By W. ELBORNE.
2. Analysis of English Rhubarb. By W. ELBORNE.
3. Final Report upon the Alkaloidal Value of Commercial and Wild Belladonna. By A. W. GERRARD, F.C.S.
4. Report on an Investigation of the Chemistry, Botany and Pharmacy of the Strychnos Nux-Vomica. By WYNDHAM R. DUNSTAN, F.C.S., and F. W. SHORT.
5. Standardizing of Pharmaceutical Preparations. By G. F. SCHACHT, F.C.S.
6. Standardizing Galenical Preparations. By D. B. DOTT, F.R.S.E.
7. The Pungent Principles of Plants. By J. C THRESH, D.Sc., etc.
8. On the Pharmacy of Linseed. By T. GREENISH, F.C.S., F.R.M.S.
9. Note on Certain Anhydrous Essential Oils. By J. WILLIAMS, F.I.C., F.C.S.
10. On Tincture of Orange Peel and Tincture of Quinine. By R. WRIGHT.
11. Note on China Bicolorata or Tecamez Bark. By JOHN HODGKIN, F.I.C., F.C.S.
12. Analytical Notes on Hydrocyanic Acid and Cyanides. By L. SIEBOLD, F.I.C., F.C.S.
13. A Fossil Aloe from the Wealden. By G. A. KEYWORTH, F.C.S.
14. Sesame Oil as a Basis for Lead Plaster. By T. MABEN.
15. Report upon the Strength and Condition of Commercial Specimens of Hydrargyrum cum Cretâ, Pilula Hydrargyri and Unguentum Hydrargyri. By M. DECHAN and T. MABEN.
16. On the History and Properties of Cashew-Nut Oil. By A. J. BALMANNO SQUIRE, M.B., etc.
17. Further Observations on the Preservation of Medicinal Plants by Ensilage. By Professor QUINLAN, M.D., etc.
18. Report on Commercial Peruvian Balsam, and the Method for ascertaining its Purity. By PETER MACEWAN.
19. Note on the Presence of Copper in some Pharmaceutical Preparations. By J. R. HILL.
20. Note on Mylitta Australis. By W. SOUTHALL, F.L.S.
21. The Filtration of Lard. By W. WILLMOTT.
22. On the Composition of Seidlitz Powders. By W. MARTINDALE, F.C.S.
23. Analyses of some Old Cinchona Barks. By DAVID HOOPER, F.C.S.
24. On Hymenodictyonine, an Alkaloid from Hymenodictyon Excelsum. By W. A. H. NAYLOR, F.C.S.

The anticipation expressed last week in respect to the Medical Acts Amendment Bill has been justified by the event, for on Friday evening, the 25th ult., Mr. Gladstone, in reply to a question, stated that the Government did not intend attempting to proceed further with it this session, and subsequently the order for committee was discharged and the Bill withdrawn. In another part of the Journal will be found a fresh instalment of the list of petitions that have been presented to Parliament in favour of the amendment of the Bill in respect to the constitution of the Pharmacopœia Committee.

* * *

On the first day of July the "Pharmaceutical Society of Victoria" ceased to exist, and merged into the new "Pharmaceutical Society of Australasia."

* * *

The Government of Victoria, at the instance of Mr. C. R. Blackett, the late President of the colonial pharmaceutical society, has recently presented to the library of the Pharmaceutical Society of Great Britain a copy of Baron Mueller's splendid monograph of the Eucalypts. A similar presentation is to be made to the British Pharmaceutical Conference.

Provincial Transactions.

HAWICK PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The first monthly meeting of the present session was held on July 11, when instead of having the usual indoor gathering, the members assembled in the Pipelheuch Woods, a botanical excursion to that place having been arranged for.

A large number of plants were collected, a few of the more characteristic of which were described on the ground by one of the members, specimens being brought home for subsequent drying and mounting for the Society's Herbarium.

Proceedings of Scientific Societies.

ROYAL INSTITUTION OF GREAT BRITAIN.

The Physiological Aspect of Mesmerism.*

BY J. N. LANGLEY, M.A., F.R.S.

(*Concluded from p.* 59.)

Whatever the will may be, its action is accompanied by a certain activity of the cortex of the brain ; if this activity is prevented from taking place, the will can no longer act. From the physiological standpoint, then, the mesmerized frog lies motionless because an inhibition of a particular activity of the nerve cells of the cortex has taken place. We may distinguish two chief causes of this inhibition.

The tactile stimuli sent to the central nervous system when the frog lies on its back are obviously different from those sent when the frog is in its normal position. The unusual nerve impulses travelling from the skin in the unusual position of the frog are inhibitory nerve impulses. There is reason to believe that they act first on some lower centre of the brain, and that from this, impulses are sent which diminish or annul the activity of the cortical nerve cells which is necessary for the exercise of will.

The second chief cause of inhibition is in the cortex itself. Handling the frog in the way which is done when it is mesmerized, produces a certain emotional condition which we may call fright. But when the animal is frightened, the nerve cells of the cortex are set in activity in a special manner. This mode of activity inhibits other modes of activity, and the will is paralysed.† We cannot at present, I think, put in any more definite form the effect of one state of the cortex of the brain upon its other possible states. We do not know enough of the relations of the cortex of the brain to the psychical functions to say more. In some cases fright seems to play a very small part, if any, in producing the effect. That it is not an essential factor is, to some extent, confirmed by the fact that a frog without the cerebral hemispheres can be easily mesmerized ; it is difficult to conceive of the animal in this state being very much frightened.

It will be remembered that reflex action from all parts of the body is diminished in the mesmerized frog. After a time, then, there is a marked inhibition of activity of the whole nervous system. Now in the brainless frog placed on its back there is no such diminution of reflex action ; hence in the intact hypnotized frog the spinal cord must be inhibited by impulses coming from the brain ; from which we may conclude that centres inhibited in their own proper action, nevertheless send out inhibitory impulses to other centres. There appears then to be an irradiation of inhibitory impulses, just as we have seen that there is an irradiation of exciting impulses.

There are two other features in the hypnotized frog which I must mention, although time will not allow me to discuss them. It sometimes happens that soon after a frog has been hypnotized, reflex actions, instead of being more difficult to obtain than normally, are obtained more easily. Preceding the condition of reflex decrease there is a condition of reflex increase. Further, it sometimes happens that the hypnotized frog, instead of lying with its muscles flaccid, passes into a cataleptic state, so that its limbs tend to remain in any condition in which they are placed. Both the condition of reflex increase and that of catalepsy are more marked in man.

Before passing to mesmerism in man I will show you two other instances of hypnotism in the lower animals. The alligator which you see here behaves very much like the frog. It has, however, less tendency to become cataleptic. After a brief struggle, it becomes quiescent and its limbs slowly relax ; its mouth may then be opened, and a cork placed between its teeth, without giving rise to any voluntary movement on its part. It may be kept for a considerable time in this limp condition by gently stroking the skin close to its eyes.

So far as I have observed, the hypnotic condition in birds and in lower mammals is not capable of any great development. It may last ten minutes, but rarely longer. In these animals, too, the emotional condition is probably the chief factor in producing the inhibition. Of impulses from peripheral sense organs, tactile impulses seem to be most effective in the lower mammals, as in the rabbit and guinea-pig, and visual impulses in the bird. The pigeon which I have here, remains longest quiescent when, after it has been held for a minute or two, I bring my hand slowly up and down over its head.

In man the phenomena of mesmerism are of a very much more striking character than they are in the lower animals. Speaking generally, this seems to be due to a greater interdependence of the various parts of the nervous system in the lower animals. In these, when any one centre is stirred up by exciting impulses, an irradiation of exciting impulses is apt to take place to all other centres, and the mesmeric state is in consequence apt to be broken. And on the other hand, when a centre is inhibited, an irradiation of inhibitory impulses is apt to take place, and the whole nervous system is in consequence apt to be inhibited. Hence the activity or suppression of activity of particular parts of the central nervous system, which forms so conspicuous a feature of mesmerism in man, can be only partially produced in the lower vertebrates. Even in man there is very considerable difference, in different individuals, in the ease with which particular nerve centres can be excited or inhibited without other centres being similarly affected. But apart from this the fundamental features are the same, whether a man or a frog be mesmerized. The primary point is, as I have said, the paralysis of the will, that is, the inhibition of a certain activity of the nerve cells of the cortex of the cerebrum.

In man, as in the frog, this inhibition may be brought about either by impulses proceeding from the peripheral organs of sense, or by impulses originating in the cortex itself. Of the former class, tactile and visual impulses are most effective, although the mesmeric state may be produced by auditory and probably by other impulses. A man may, then, be mesmerized by passing the hands over or close to the skin, or by making him look steadily at an object, or listen intently to a sound.

Whether the inhibitory impulses so set up produce inhibition or not, depends upon the condition of the whole of the nervous system. The effect of the inhibitory impulses may be counteracted by exciting impulses coming from other parts of the central nervous system. In many

* Read at the Weekly Evening Meeting, March 14, 1884.

† The term "paralysis of the will" is here used to include the state in which there is an effort of will, but in which the effort is not followed by a despatch of nervous impulses from the cerebral hemispheres to the lower nervous centres.

people the exciting impulses are always sufficiently strong to overpower the inhibitory ones, and such people cannot be mesmerized. In others, the inhibitory impulses must be kept up for a long time, and repeated on successive days, before they acquire sufficient force to overcome the exciting ones. Such people are mesmerized with great difficulty.

The great majority of people cannot be mesmerized unless they consent to fix their attention on some particular object. This fixing of the attention, speaking generally, seems to be a voluntary exclusion of exciting impulses, leaving thus the inhibitory ones an open field. Idiots, who, on account of the lack of co-ordination of their nerve centres, cannot fix their attention for any length of time on any one object, cannot as far as I know be mesmerized. Now this, now that part of the brain becomes active, and exciting impulses are sent out which overpower the inhibitory ones.* Inhibition from impulses arising in the cortex itself are rare unless the patient has been previously mesmerized. Some such cases, however, do occur. But in people who have been previously mesmerized inhibition in this manner is of not unfrequent occurrence ; within limits, the more often the changes in the cells accompanying inhibition have been produced, the easier they are to reproduce. Those who have often been mesmerized may fall again into this condition at any moment, if the idea crosses their minds that they are expected to be mesmerized.

Thus if a sensitive subject be told that the day after to-morrow at half-past nine he will be mesmerized, nothing more need be done ; the day after to-morrow at half-past nine he will remember it, and in so doing will mesmerize himself.

An instance sent by M. Richer to Dr. Hake Tuke, presents, it seems to me, an example of inhibition from the cortex which is of a somewhat different class, and more allied to that which occurs in birds and lower mammals. A patient was suspected of stealing some photographs from the hospital, a charge which she indignantly denied. One morning M. Richer found this patient with her hand in the drawer containing the photographs, having already transferred some of them to her pocket. There she remained motionless. She had been mesmerized by the sound of a gong struck in an adjoining ward. Here, probably, the changes in the cortex accompanying the emotion which was aroused by the sudden sound at the moment when she was committing the theft, produced a widespread inhibition—she was instantaneously mesmerized.

I will show you the method of mesmerizing which is, perhaps, on the whole, most effective; it is very nearly that described by Braid. I have not time to attempt a mesmeric experiment to-night, it is the method only which I wish to show you. With one hand a bright object, such as this facetted piece of glass, is held thus, eight to twelve inches from the subject, so that there is a considerable convergence of the eyes, and rather above the level of the eyes, so that he is obliged to look upwards. The subject is told to look steadily at the piece of glass, and to keep his whole attention fixed upon it. This position is kept up for five to ten minutes; during this time the pupils will probably dilate considerably, often assuming a slight rhythmic contraction and dilation; when this is the case the free hand is moved slowly from the object towards the eyes. If the subject is sensitive, the eyes will usually close with a vibratory motion. In some cases the subject is then unable to open them, and the usual mesmeric phenomena can be obtained. If when the operator brings his hand near the eyes of the subject, the subject instead of closing them follows the movements of the fingers, the whole proceeding is repeated, but the subject is told to close his eyes when the fingers are brought near them, but to keep them fixed in the same direction as before, and to continue to think of the object and that only. The operator then for some minutes makes "passes," bringing his warm hands over and close to the face of the subject in one direction. When the subject is inclined to pass into the cataleptic state, an indication of his condition may be obtained by gently raising his arm ; if he is beginning to be mesmerized, the arm remains in the position in which it is placed. If the arm falls, the mesmeric state may not infrequently be hastened on by telling the subject to keep his arm extended whilst he is still gazing at the object, or whilst the passes are being made. And that is the whole of the process. The man thus mesmerized sinks from manhood to a highly complicated piece of machinery. He is a machine which for a time is conscious, and in which ideas can be excited by appropriate stimulation; anyone acquainted with the machinery can set it in action.

The distinguishing feature of the earlier stages of mesmerism in man is that by slight stimulation any one centre can be easily set in violent activity, and its activity easily stopped, without the activity spreading to other distant centres. It is on this that the mesmeric phenomena usually exhibited depend; with most of these phenomena you are no doubt familiar, so that I need mention one or two only.

Complicated reflexes may be produced in various ways, just as we have seen is the case with a frog even when without its cerebral hemispheres. Thus Braid mentions that on one occasion an old lady who had never danced, and who indeed considered it a sinful pastime, when mesmerized began to dance as soon as a waltz tune was played.

A statement made to a subject will often produce implicit belief notwithstanding the evidence of his senses. I remember telling a subject that I was about to bring a hot body near his face, and he was to tell me when it was painful. I put my finger on his cheek, upon which he cried out violently that I was burning him. When he was awakened he remembered that I had touched him with something very hot. The idea I had given him was remembered, the evidence of his sense of touch was disregarded. Even in ordinary, apparently wakeful, life, an idea may produce a belief in no way borne out by the evidence of the senses. Dr. Beard narrates that once when crossing the Atlantic, the steamer he was in ran into a sailing vessel. It was at night, and amidst the roar of the wind, the shrieks, and cries, and prayers of the passengers, the cry went forth that the steamer was stove in and the bow sinking; straightway all eyes were turned to the bow, and to every eye it seemed to be sinking. "I shall never forget," he says, "how it gradually lowered in the darkness." In fact, however, the vessel was uninjured, and the bow did not sink at all. Here probably the majority of the people present passed simultaneously into a condition resembling the mesmeric condition; the idea presented to them by the cry "the bow is sinking" being more powerful than the ideas aroused by the objects actually seen.

But even in the absence of strong emotion, it may happen that an idea suggested by a statement may be more powerful than the proper sensory impression. There are some persons, apparently perfectly trustworthy, who nevertheless, if they were told to look closely at the top of this bell-jar and see the faint flame coming from it, would very soon see the flame quite distinctly. In health, as well as in disease, there are many partial revelations of the conditions produced by mesmerism.

In some subjects the sensibility of the skin to variations of temperature is very greatly increased, so that the contour and size of an object which is brought near the skin can be recognized by the alteration in the feeling of temperature of the part. The size and contour of an object, such as a book or a coin, being thus known, the

* It is said that some persons, whilst they are sleeping, can be brought by means of passes into the mesmeric state. It would be interesting to observe if this can also be done with insane people.

subject may of course be able to guess that a book or coin is being held before him.

There are certain attitudes which we usually assume under the influence of certain moods or ideas; from each of the muscles concerned in bringing about any one attitude, impulses travel up to the brain, and give rise to a definite muscular sensation which comes therefore to be associated with a particular mental mood. In mesmerized people the production of a definite muscular sensation not infrequently produces in the mind the mood with which it is, in the wakeful state, associated. At the same time ideas may be produced corresponding to the mood, and the ideas may give rise to particular actions, such as laughing, crying, fighting.

If the head is pushed back and the shoulders opened out, the face assumes a look full of pride or haughtiness, and if the subject be asked what he is thinking about, he will give some answer indicating what a fine fellow he fancies himself to be. If, then, the head is bowed and the shoulders contracted, the aspect of the face changes to one of humility and pity. Occasionally it happens that a slight pressure on a single muscle, which causes it to contract, will by an irradiation of nerve impulses produce the muscular sensations proper to a group of muscles, and this will give rise to the associated frame of mind. Thus very different feelings may be made to rapidly succeed one another in the mind of the subject by simply pressing on various muscles of the head and neck. At first sight such an experiment looks like a revival of the now happily forgotten phrenology.

I have said that in a frog which remains mesmerized for any time, there is a considerable reflex depression, *i.e.*, inhibition of the whole of the central nervous system —that there is an irradiation of inhibitory impulses. In man a similar irradiation of inhibitory impulses appears to take place; usually a mesmerized person if left alone passes gradually, but often rapidly, into a state of torpor; consciousness disappears, memory is lost, reflex action becomes difficult to obtain, finally, it may be, there is complete anæsthesia, a limb may be cut off without producing any movement or any pain; since this torpor comes on without anything further being done to the subject, we may conclude that here, as in the frog, but to a much more marked degree, there is an irradiation of inhibitory impulses. The primarily inhibited centres send out inhibitory impulses to all other nerve centres. Up to a certain stage, possibly throughout, any one or more centres may be brought back to a condition of activity by certain exciting stimuli, but when these cease the inexcitable condition is soon brought back by the inhibitory impulses streaming to them from other nerve centres.

The extent to which the torpid condition develops itself varies in different individuals. It depends upon the condition of the nervous system, upon the relative intensities of the inhibitory and exciting impulses. As far as our present knowledge goes, it would appear that a few only of those who can be mesmerized can be made to pass into a condition of complete anæsthesia. It is possible, however, that this may be due to the passes which give rise to inhibitory impulses not being continued long enough. Dr. Esdaile, who in India was accustomed to mesmerize his patients before performing surgical operations upon them, used to continue the passes for one to two hours, and often to repeat this for several days in succession.

In different people the order in which different centres are inhibited varies, as we should expect from the unequal development of different centres in different people. This is no doubt of influence in determining whether the general state is cataleptic, somnambulistic, or lethargic, and here probably the method used to mesmerize is also of considerable importance; it would seem that the cataleptic condition is more likely to be developed when the process of mesmerization involves a strain on the eyes of the subject, than when he is mesmerized by passes. Not much attention, however, has as yet been directed to this point.

There can, I think, be no doubt that mesmerism may help, and sometimes cure, persons suffering from certain diseases of the nervous system. It is not in our power to make any accurate statement of the way in which this is brought about; but since disease may be the result of either an over-activity or of an under-activity of any part of the central nervous system, it is reasonable to suppose that a beneficial effect will follow the employment of a method which allows us to diminish or increase these activities as we will. This is a side of the question which is of the greatest interest both to physicians and to physiologists—to physiologists, since it bears directly upon the problem of the influence of the nervous system on nutrition. There is good reason to believe that by directing attention strongly to any particular part of the body, the nutritive state of that part of the body may be altered. The determination of the actual way in which this is brought about is full of difficulties, but the following way is at least theoretically possible. It may be that the nerve centres connected with the tissue in question are made unusually active, and that they send out nerve impulses of a trophic nature, that is, impulses which directly control the nutrition of the tissue. The alteration in the tissue caused by its changed nutritive state—its changed metabolism—may conceivably be either beneficial or detrimental to the whole organism; it may give rise to a diseased state, or get rid of an existing one.

The modern miracles of healing, wrought in persons in a state of religious enthusiasm, offer a field for investigating this problem; the field, however, is a particularly bad one, and chiefly because so many people concerned regard any careful examination of the subject as impious. But in mesmerized persons it seems probable that such investigations could be made on a fairly satisfactory basis. Men when mesmerized gradually lose remembrance of those things which they remember when they are awake, but not infrequently other things are remembered which are forgotten in the waking state.* This is normally the case with a person who has been previously and recently mesmerized. He may then remember little else than what took place in the corresponding stage of his previous mesmerization. In a certain state then, an event or a command will produce in the central nervous system those changes which are necessary for the event or the command to be remembered later, without ever rising to consciousness in the waking condition. Thus a command to do a particular thing, given to a subject in this mesmeric stage, may be carried out when he awakes, although he is quite unconscious why he does it. We may say that such an act is one of unconscious memory. But it is, I think, something more than this. The subject is usually uneasy and preoccupied until the thing is done; he is to a greater or less extent unable to fix his attention on other things; he is, in fact, in a state of unconscious attention to an unconscious memory. This brings us to our point. It suggests that if a subject in a certain stage of mesmerization be told that in a few days a sore will appear upon his hand, or conversely that a sore already there will disappear, the conditions which accompany conscious expectation and attention, will to a certain degree be established; and the trophic influence of the nervous system on the tissues may be tested in a manner which puts the experi-

* A case is recorded by Braid, of a woman, who during natural somnambulism—which is almost identical with a state that can be produced by mesmerism—could repeat correctly long passages from the Hebrew Bible, and from books in other languages, although she had never studied any of these languages, and was quite ignorant of them when she was awake. At length, however, it was discovered that she had learnt the passages when she was a girl, by hearing a clergyman with whom she lived read them out aloud.

ment fairly within the control of the observer, and to a certain degree excludes imposture. Such an experiment has obviously some drawbacks, it would probably only succeed, if it succeeded at all, with a person whose nervous system was in a state of unstable equilibrium; and it can hardly be expected that the effects would be so striking as when conscious expectation is also concerned. Still observations of this kind are well worth attention, on account of the medical, the physiological, and the psychological issues involved in the results.

A lightly mesmerized subject can be easily brought back to a normal condition by a sudden slight shock, by sprinkling water on theface, or by a current of cold air. These give rise to exciting impulses which arouse to normal activity the inhibited parts of the brain; just as we have seen that any other part of the central nervous system can be aroused to activity by slight exciting impulses. There is no mystery in this, beyond the mystery which lies in the relative action of all exciting and inhibitory impulses. The power of responding in strikingly different ways to weak stimuli differing in kind, or to stimuli apparently of the same kind, but differing in intensity, is not peculiar to the nervous system of man; it is a power possessed by the nervous system of all animals, and indeed, not improbably by all living substance. This has already been touched upon in what I have said of inhibition, but I will give you one or two other instances of the dissimilar effects produced by slight, and apparently not very dissimilar, stimuli, instances which are especially pertinent to the subject of mesmerism. These we owe to Heidenhain.

When morphia is given to a dog, and the animal is left undisturbed, it passes into a condition resembling sleep; but a little investigation usually shows that the condition differs in certain notable respects from sleep. Whilst consciousness, as far as can be told, is gone, and voluntary movement is abolished, many reflex actions can be obtained much more readily than in the waking state; moreover, there is a tendency for the muscles which contract in a reflex action to remain contracted, the nerve centres when set in activity remain active for a considerable time, and continue to send out impulses to the muscles, which in consequence are kept contracted; in other words the reflex contraction produced by a slight stimulus applied to the skin is of a tonic instead of a tetanic nature. Now this tonic contraction can be brought to an end by various slight stimuli, for instance, by lightly stroking the skin over the contracted muscles, by gently tapping the contracted part, by blowing in the face of the animal, or by stimulating the cortex of the brain by a weak electric current. Nevertheless, the acts just mentioned may, when the muscles are not contracted, cause or help to cause their contraction. I will give an instance of this. Electrical stimulation of a definite part of the cortex of the brain causes a tonic contraction of certain muscles of the leg, in consequence of which, let us say, the leg is bent and remains so. Now we have seen that passing the hand over the skin of the leg will cause it to unbend; well, if the cortex of the brain be stimulated with an electric current, not quite strong enough to produce of itself bending of the leg, the bending may at once be produced by gently stroking the leg at the same time as the cortex is being stimulated. Of a similar nature is the effect of electrical currents of different strengths. When a limb has been brought into a state of tonic contraction by electrical stimulation of a certain part of the cortex of the brain, a weaker electrical stimulation of the same spot of the cortex will bring the tonic contraction to an end.

The phenomena just described as occurring in a dog under the influence of morphia, closely resemble those often observed in human beings when mesmerized. Commonly in a mesmerized person the arm, let us say, may be made to bend by gently stroking the skin over the appropriate muscles; give a slight tap on the arm, and it relaxes. Braid observed in some subjects that if a limb was made rigid by passing the hands over it, and if it was left extended for a short time, then the repetition of the same act of passing the hands over the limb caused the rigidity to disappear. It is unnecessary, I think, to consider in detail the corresponding states in the narcotized dog and the mesmerized man; enough has been said to show that in both certain slight stimuli produce, sometimes excitation, sometimes inhibition.

It must, however, be noted that our conception of inhibition is not rendered clearer by these facts; for it would appear from them that a nerve centre may be excited or be inhibited by the same nerve impulse, the result depending upon the condition of the nerve centre. This is not a necessary inference, but it is perhaps at present the most convenient working hypothesis. A certain group of facts, indeed, may be held together and receive a provisional explanation by saying that in some conditions of the central nervous system, a stimulus excites a nerve centre if it is quiescent, and inhibits it if it is active.

It seems to me probable that what is called the "transference of contracture" and the "transference of sensation" are of the same order of facts. These phenomena are exceedingly curious. Suppose that the left biceps of a mesmerized person be gently stroked or pressed, so that it contracts and remains so. The continuous contraction of the muscle is called contracture. In consequence of the contracture the arm is kept bent. Suppose that the biceps of the other arm be gently stimulated, we may get a transference of the contracture, *i.e.*, the right biceps becomes contracted and the right arm bent, whilst the left arm which previousiy was bent falls flaccid. Similarly there may be a transference of sensation; thus the right arm say is rendered insensitive, so that pricking it with a needle does not give rise to any sensation; on the back of the right hand a piece of metal, such as a two-shilling piece, is now placed, and left for a short time. On removing it, it is found that the spot of skin which was in contact with the metal has become sensitive, so that the prick of a needle is at once felt, but that the corresponding part of the other hand has become insensitive, so that pricking it with a needle produces no sensation.

The observations of this kind have hitherto been made almost, though not quite exclusively, upon patients suffering from certain diseases of the nervous system, and the facts have been described as occurring both in the wakeful and in the mesmeric state. The proximate explanation appears to be, to take the case of transference of sensation just mentioned, that the gentle tactile stimulus caused by the pressure of the coin on the skin, reaching an inhibited centre, sets it in activity, and the sensibility of that part of the skin is restored, but the stimulus passes on to the corresponding and hitherto active centre of the opposite side of the body, and this is inhibited.

Here I must leave the subject. I have not attempted to give an accouut of all the phenomena of mesmerism; I have taken those phenomena which seemed to me to be the least easy to understand, the most liable to misconception, and have attempted to show that they resemble fundamentally certain simpler phenomena which can be observed in lower animals. I have further attempted to string together the various facts upon a thread of theory, which may be briefly summed up as follows:—

The primary condition of mesmerism is an inhibition of a particular mode of activity of the cortex of the brain, in consequence of which the will can no longer be made effective.

This inhibition may be brought about by nervous impulses coming from certain sensory nerves, as those of sight, touch, hearing.

It may also be brought about by impulses or changes arising in the cortex itself.

The inhibited cortex, and probably also inhibited lower centres of the brain, send out inhibitory impulses to all other parts of the central nervous system, so that the mes-

merized man or animal gradually passes into a state of torpor, or even of complete anæsthesia.

The phenomena of the excitable stage of mesmerism are proximately determined by the possibility of exciting any particular centre alone, without exciting at the same time other centres by which its activity is normally controlled. In lower animals this stage is less marked in consequence of a greater interdependence of the various parts of the central nervous system.

I would expressly state that I regard this theory only as provisional. Further, I am quite conscious that it is very imperfect. A complete explanation of the phenomena of mesmerism and of its allied states can only be given when we have a complete knowledge of the structure and functions of all parts of the central nervous system. But I have not much doubt that the explanation of the main features of mesmerism will be found when we are able to answer the question—What is inhibition? And it is some comfort to think that the answer awaits us in the comparatively simple nervous system of the lower animals. I would not be understood to mean that variation of blood supply and various other events are of no influence in producing mesmeric phenomena; I think, however, that these events are of secondary importance only.

Finally, I would say a word about the attitude of physiologists to animal magnetizers and mesmerists. It has sometimes been made a subject of reproach to physiologists that they have not concerned themselves more actively in investigating mesmeric phenomena. The reproach has very little foundation. The knowledge which has been gained on the subject has been gained almost entirely by medical practitioners and by physiologists, and it must be remembered that until lately most physiologists were also medical practitioners; the division of labour is of recent date.

It is, however, true that in the beginning and middle part of this century there were many scientific men who regarded the subject with a contempt which, intrinsically, it did not deserve. But, in my opinion, they had much justification. A scientific man has always before him some problems which he knows he can solve, or help to solve. He has always before him a road which he knows leads somewhither. Mesmerism was long mixed up with assertions of the transmission of cerebral fluid, with impossible notions which had been banished from physiology, and with charlatanism. The scientific man of that day may, I think, be readily pardoned for supposing that the facts which were given as not more true than the theories, might be equally false. Why should he leave the fruitful work his hand had found to do for that which to all appearance would be barren?

Dr. Esdaile, who although himself not altogether free from blame for mystifying the subject, yet did much to advance it, expresses what must have been a general feeling:—"The ignorance and presumption of man; his passion for the mysterious and marvellous; his powers of self-delusion, with the pranks of knaves and the simplicity of fools, have so mystified the subject that the artificial difficulties cost us more trouble to remove than the natural; and a mass of rubbish must be got rid of before we can reach the foundation stone of the truth."

INTERNATIONAL HEALTH EXHIBITION.

Conference on the Water Supply.

A Conference on this subject, convened by the Society of Arts, commenced its sittings on July 24, at the Health Exhibition, under the presidency of Sir Frederick Abel, C.B., F.R.S.

In opening the proceedings the Chairman said it was only owing to the sudden death of the Duke of Albany that the Conference was not opened by the Prince of Wales as the first of the series, His Royal Highness having for a long time taken a deep interest in this important question, as shown by his having in 1878 suggested the holding of a Conference by the Society of Arts, when a number of valuable papers were read by some of the highest authorities. Having referred to the conflicting views held by eminent men on the question of the self-purification of rivers and to the various conditions which affected the question of water supply, the Chairman stated that it was desired to consider mainly geological, medical and chemical questions, omitting legal and financial difficulties. The first portion of the subject taken up would be sources of supply.

The first paper was on the "Area of Chalk as a Source of Water Supply," by Mr. W. Whitaker, F.G.S. He pointed out that it was only of late years that the water bearing formation of the south-east of England could be measured with any approach to certainty, and even now it could only be done partially; but after a long and careful examination of this question, the author had constructed maps showing where the chalk is bare, where it is covered by permeable, and where by impermeable beds, and where the upper beds are of a mixed character. These various maps were then analysed, the result showing that of the first there were about 125 square miles, of the second 88, of the third 430, and of the last 180 square miles. This result somewhat curtailed the excessive estimates which had been made of the chalk area available as a source of water supply, but it still remained the chief water bearing bed in the south-east of England.

"Water Supply in its Influence on the Distribution of Population" was the subject of an interesting paper by Mr. W. Topley, F.G.S. It was shown that in early times villages and settlements were always on the banks of a river or in places where the geological formation allowed of obtaining water from shallow wells or springs. Later the aggregation of population was more governed by mining and manufacturing considerations, and the health of the people often suffered in consequence. In modern towns the water supply was either drawn from a neighbouring river, brought from a distance, or from deep wells, thus differing from early settlements; but in many cases the primitive sources of supply had continued in use long after they should have been abandoned. London itself afforded a good example of these points; beneath it the strata lie in a basin-shaped form and favour the accumulation of water; and it was a remarkable fact that other capitals, such as Paris, Berlin and Vienna, were similarly situated.

Mr. C. E. De Rance, F.G.S., F.R.G.S., then read a paper on "A possible Increase of Underground Water Supply." His main contention was that a vast amount of the annual rainfall which either ran away uselessly to the sea or operated prejudicially in the form of floods might be utilized to supply localities which now suffered from want of water. This was worked out by a detailed description of the various geological strata, and the way in which the water made its way through or accumulated in them. The area of England and Wales occupied by porous rocks was estimated at over 26,000 square miles, and over the whole of this area drawing wells might be sunk with advantage, and their supply increased by sinking inlet or drainage wells to carry into the stata water now entirely lost or destructive.

Mr. Joseph Lucas followed with a paper on "Water from the Chalk," very much on the lines of the one read by Mr. Whitaker, but going more into detail with regard to particular localities. He concluded with the hope that a resolution would be passed to the effect "that a national survey of the sources of water supply, both surface and subterranean, should be set on foot by the Government with the least possible delay."

A discussion followed on the above by Messrs. Robinson, Conder, Baldwin, Latham, Smartt and Kinsey, after which a short adjournment took place.

On resuming, a paper was read by Mr. G. J. Symons, F.R.S., on "The Origin of Water Supply." It referred,

of course, to the rainfall, with measurements of which the author has been so many years connected. The construction of rain gauges having been described, the author narrated what he had done during the last twenty-five years to establish a complete system of recording the rainfall, 99 per cent. of the cost of which was borne by the observers themselves, who now numbered nearly three thousand. A complete discussion of the data obtained had not yet been made, but a map constructed some years ago showed that some districts had twice and even thrice as much rainfall as others. It was suggested in view of future changes in the distribution of population, that any water rights conferred by private Acts of Parliament should be subject to revision at the end of one hundred years.

The next paper was by Mr. E. Bailey Denton, on "Water Supply to Villages and Rural Districts." It was the author's opinion that very often the members of local boards rather sought to avoid the duties devolving upon them in this matter, and it was therefore easy to understand why the water supply in rural districts was so often defective. The various modes of well sinking were then discussed, and the importance of efficient filtration pointed out where surface waters were employed.

Mr. E. Easton read the next paper, in which he insisted on the necessity of water for consumption being free from contamination by organic and other impurities. All direct pollutions should be prevented from coming in at the source, and in almost every instance efficient means of filtration should be provided. Deterioration before use should be prevented by a proper mode of distribution. Without a constant supply it was impossible to avoid deterioration, as with an intermittent supply there was serious danger of contamination from the admission of foul air or gas into the mains when the water was cut off, though it was not for many reasons desirable that the supply should be unlimited in quantity, and the supply should be under proper regulation to prevent waste and misuse. He suggested that a minimum quantity should be supplied at a fixed rate and all above that be paid for by meter. According to the last returns not more than half the London supply was really used, and at the present period of contamination of the Thames a reduction of even 33 per cent. in the water abstracted from the river would go far to ameliorate its condition.

A paper, by Mr. James Mansergh, C.E., followed, dealing with the "Sources of Water Supply" and the geological formation which affected it. All water when discharged upon the earth, as snow or rain, was practically pure, but its character was very soon changed by the material it came in contact with on the surface or in its passage through underground fissures and channels. Lime and magnesia thus taken up had the effect of making the water hard, but igneous, metamorphic, cambrian, silurian, devonian, millstone grit, coal measures, lower greensand, London and Oxford clay, Bagshot sand and non-calcareous gravels yielded soft water as a rule. For dietetic purposes the quality of hardness if not excessive was not considered objectionable on physiological grounds. On the whole, taking into account all the purposes for which water was used, it could hardly be questioned that a pure soft water supply was on the whole preferable to a pure hard water supply. Except as producing hardness the inorganic matters usually found in water were practically harmless, but organic pollutions might be of the most disgusting and dangerous character, those, for instance, which were the result of town sewage or cesspool contamination. Water obtained from elevated moorland levels was practically in the condition in which it fell from the clouds. An account was given of the works by means of and the formations from which the various water supplies in England were obtained.

The Conference on this subject, convened by the Society f Arts, resumed its sittings on Friday morning at 11 o'clock, under the presidency of Sir Frederick Abel, C.B., F.R.S.

The first paper was by Mr. S. C. Homersham on "Water for Domestic Use," in which he advocated the use of deep well water from the chalk as the purest, which should be softened by Clark's process. Next came one by Mr. Baldwin Latham on "The Softening of Water," in which the various processes adopted in early times were referred to, and a detailed account of Dr. Clark's process given. It appeared that upwards of thirty patents had been taken out for removing lime from water.

The next paper, by Professor H. C. Sorby, LL.D., F.R.S., dealt with the much vexed question of the purifying action of minute animals and plants on water contaminated by sewage. The author had proved by experiment that the entomostraca in particular might be kept alive for months by feeding them on excrementitious matter, and there was no doubt that an immense amount of sewage material was consumed by these animals. It could not be supposed, however, that these comparatively large animals removed except incidentally such minute objects as disease germs, but it was well worthy investigation whether the more minute infusoria consumed such germs as a portion of their food. He had not been able to examine this question critically, but was inclined to think that even particles the size of germs might be consumed by beings only $\frac{1}{1000}$ inch in diameter. The influence of minute plants was also very great in purifying and oxygenating water.

A paper, by Mr. W. Anderson, describing a method of purifying water on a large scale by contact with finely divided iron as suggested by Sir Frederick Abel, and carried out by the author at Antwerp, where two million gallons per day are successfully treated, followed.

Professor Odling, F.R.S., then read a paper on "The Chemistry of Potable Water." He said that absolutely pure water must be regarded as an ideal rather than real chemical substance, as there were always various matters held in solution or suspension. Some of these were prejudicial to health, some innocuous, and some, such as saline matters in moderate proportion and particularly dissolved aërial matter, positively beneficial. There could be hardly any doubt that the actual mixed substance usually termed water is better suited to supply the wants of daily life than the ideal pure substance would be, and, therefore, this ideal should not be looked upon as the standard of excellence to which the daily supply should as far as possible approximate. The latter half of the paper consisted of a discussion of the organic matter in water, and it was stated that the amount of this impurity in the Kent Company's water is just under one-tenth grain per gallon, New River Company just under two-tenths, East London Company, Birmingham, and Glasgow, the latter being lake water, two-and-half-tenths, Thames Company three-tenths; but this was owing to winter floods, the average in the summer being less than at Glasgow.

The paper was summed up in a series of conclusions the most important of which was the last, viz., that there is no presumption of the presence in river waters of disease-producing organisms, and what little was known of their life-history and the evidence from what had been observed of the effects on the health of populations would lead to the inference that they do not develop, propagate or exist in such water so as to be capable of acting prejudicially.

A discussion on the foregoing papers, in which Mr. W. S. Mitchell, M.A., Dr. Jabez Hogg, Messrs. Edwin Chadwick, Bischof, Dr. Bartlett Maignen, Dr. Haughton Spencer and others took part, occupied the rest of the morning until the mid-day adjournment.

At the afternoon sitting papers were read by Col. Sir Francis Bolton on "Water Distribution and Dual Supply," which was not recommended, except under special circumstances; by Mr. H. Marten on the same subject

in which he pointed out forcibly the advantages of a constant over an intermittent supply; by Mr. J. H. Greathead on "Water Supply for Fire Extinction," in which the methods adopted in various large towns both at home and abroad were described, and the conclusion was arrived at that a complete system of hydrants was the only way of securing immunity from disastrous fires, and, lastly, on the "Mode of Distribution of Water," by Mr. Joseph Quick, in which the constant system was warmly advocated, the difficulties in the way of its introduction pointed out with the modes of meeting them. It also dealt with the question of supply by meter. A considerable discussion followed, bearing mainly on methods for preventing waste of water in domestic use, after which the Chairman summed up the results of the Conference, and the proceedings terminated with a vote of thanks, moved by Mr. Chadwick.

Conference on Bee-Keeping.

On Friday morning, July 25, a meeting was held of the British Bee-Keepers' Association in the Jury Room of the Health Exhibition. The Rev. H. R. Peel in the chair.

Mr. F. R. Cheshire, F.R.M.S., read a paper on "Foul Brood" (not micrococcus but bacillus), the means of its propagation and the method of its cure. Agriculture, the paper stated, was now attracting more attention in this country than ever previously, and bee-keepers were multiplying on every hand. From the throne to the humblest cottage its charms were getting recognized. Bee-keeping to-day was no more like that of the first half of this century than the goods-train was like the carrier's cart. Combs were built in days instead of weeks, and bees raised drones or workers as the order was given them. Poor cottagers might add to their comforts and culture by attending to their hives. But a dark cloud was hanging over apiarians. Foul brood was rapidly increasing, and not only diseased stock, but apiaries of sixty or eighty existed where perhaps not one had escaped contamination. If the unqueening and comb-excising, or burning and starving plans had to be adopted, ruin was the result. In former days when bees were kept in the same garden, descending from father to son, and none, except an occasional swarm, left their native spot, none being every imported from afar; foul brood might have lurked here and there, but with stocks sent through the length and breadth of the land were now to be found queens hailing from the sunny south where the disease was often rampant. The present sad state of things need not, however, continue. Foul brood was a germ disease. The appearance of larvæ thus attacked was then described. The disease was terribly contagious, and once started soon spread. Experiments which had been tried in that direction were then described. Science had shown that all putrefactive changes, fermentations and very many diseases were entirely brought about by minute organisms, which were in fact rudimentary vegetables. The paper proposed that the inappropriate term "foul-brood" should be changed for *Bacillus alvei*, for this terrible and nauseous pest of the hive. So minute were they that ordinary dust-motes to these organisms would be like hen's eggs to sand grains. Salicylic acid was not a cure from the difficulty of its application. The remedy should be given in the food, so that the bees should themselves apply it, and the curative agent was phenol, used as a syrup and spray. The paper concluded with some interesting particulars of successful applications of the remedy advocated.

An interesting discussion followed, in which the speakers narrated their experiences as bee-keepers in this direction, Dr. Otto Hehner, Rev. George Raynor, Mr. Griffen, Mr. Blow, Mr. Lyon, Mr. Garnatt, Rev. F. Scott, Mr. Martin, Rev. F. S. Sclater, Rev. E. Bartrum, Mr. Harveyson, Rev. Mr. Wilkinson, Mr. A. T. Hawes, Mr. Dunman, Dr. Hooker and several other gentlemen took part. The Conference was then adjourned till Saturday.

On Saturday morning the Conference of the British Bee-Keepers' Association was resumed in the large Jury Room. The Rev. H. R. Peel in the chair.

Dr. Otto Hehner, F.C.S., F.I.C., read a paper on the "Adulteration of Honey." With all our advantages, it was stated, and our improvements in every department of life, now, as of old, honey and milk were still the embodiment of all that was delicious and desirable in food. In this age of general adulterations and semi-scientific imitators and improvers of nature, honey made, not in a bee hive, but in a factory, was a common article of commerce, and the object of the lecture was to show how honey could be made and the product of manufacture distinguished from that of the bee. A solution of starch treated with acid, generally sulphuric, was employed in the manufacture of "fine prepared table honey." Dextro-glucose or fruit sugar was in that way produced, and that product was known in the market under a variety of names, such as saccharium, browning sugar and corn sugar. The amount of sugar naturally secreted by flowers varied very much. To collect 1 pound of sugar 62,500 heads of clover would have to be deprived of their nectar, and 3,750,000 visits from bees would be necessary for the production of 1 pound of honey. But the dextro-glucose, of which honey contained about 70 per cent., not remaining permanently in solution, genuine honey became in time opaque, and even solid, and, although there were rare exceptions, a guarantee given with any sample of honey that it would remain perfectly clear, might be taken as a sure evidence of adulteration, either by addition of water or of artificial syrup. Varieties of colours, odours and flavours were given to the honey from the blossoms from which it was derived. Starch syrup was the main substitute and adulterant used at the present time. Genuine and adulterated honey yielded very different results under chemical tests. When boiled with a solution of salt of copper rendered alkaline by the addition of potash, a red suboxide of copper was deposited by the former, which would also entirely ferment away and would also turn a polarized ray from the polariscope very slightly to the left; while the latter, unlike the former, threw down abundant precipitates with lead or barium solutions, left about a fifth of its weight unfermentable, and turned the ray from the polariscope powerfully to the right. Syrups made from starch sugar had a very close resemblance to genuine honey. In America the production of starch sugar had been devoloped to perfection, but Switzerland was striving hard to carry off the "honour" attached to the production of artificial honey. In Dr. Hehner's experience, no regular English factory of spurious honey existed. Price was no indication whatever of the genuineness of the article, some of the Swiss table honeys costing retail 1*s.* 3*d.*, while perfectly pure English honey could be bought at 5*d.* and 6*d.* per pound. Fancy names were suspicious, for as good wine needed no bush, so good honey required no fancy name. With all the advantages of chemistry, so far only chemical compounds of comparative simplicity had been the result, and in not a single instance had any complex product, such as was used for food by man or beast, been obtained. We only stood on the threshold of real knowledge of organic life and saw but the rough outlines of composition of living things. It was possible, however, that in mere food value the substitutes for honey were as good as the genuine article, and only at the initiative of the public the Sale of Food and Drugs Act was enforced and corn syrup became a thing of the past.

In the course of the discussion which followed, in which Mr. Cheshire, Mr. Lyon, Mr. Dunman, Mr. Blow, Mr. Moyle, Mr. Sisson, Mr. Dyer and others took part, the expediency was urged of the branch associations putting in motion the local analysts for the detection of

adulterated honey and taking steps to open markets with published prices for the honey produced by bee-keepers throughout the country.

Parliamentary and Law Proceedings.

THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* COOKE.

At the Wandsworth County Court on Tuesday, the 29th inst., before H. Holroyd, Esq., Judge, the Council of the Pharmaceutical Society of Great Britain sued Frank Cooke, of 1, Lewis Terrace, York Road, Battersea, to recover a penalty of £5 under Sec. 15 of the Pharmacy Act, 1868, for having sold or kept an open shop for the retailing, dispensing or compounding of poison, to wit laudanum, contrary to the provisions of the said Act.

Mr. R. W. Wallace, instructed by Messrs. Flux, Son and Co., appeared for the plaintiff; Mr. Sheppard, solicitor, appeared for defendant.

Mr. T. W. Stroud, managing clerk to Messrs. Flux, Son and Co., proved that a purchase of laudanum was made on June 3 of defendant at an open shop at 1, Lewis Terrace, York Road, Battersea, that the name over the shop was "The Battersea Co-operative Pharmacy," and that defendant's name did not appear upon the Register of Chemists and Druggists.

Cross-examined: The name of the person whose name appears by the label on the bottle is upon the Register, but his address is 27, Broadway, Hammersmith, the same as appears by the label. On the day he made the purchase, he did not see the name of the person whose name is on the label over the shop, or on any part of the premises outside. He did see his name upon labels on articles in the shop, and such address that he saw was Broadway, Hammersmith. He retained the bottle under lock and key until he handed it to the analyst.

Re-examined: There are two labels on the bottle, one bearing the name, "Joseph Moyle, Dispensing and Family Chemist, The Golden Key, 27, Broadway, Hammersmith," the other bearing the words "From the Battersea Co-operative Pharmacy, 1, Lewis Terrace, York Road, Battersea."

Upon Mr. Hailes, analyst, being called to prove that the article sold by the defendant was a preparation of opium, defendant's solicitor admitted that it was what it purported to be.

Mr. Harrop, vestry clerk for the district of Battersea, produced the rate-book for the district, and proved that defendant's name appeared thereon as the occupier of the premises, 1, Lewis Terrace.

The defendant was called by the plaintiffs, and admitted having written letters subsequent to April 22 last ordering goods, and in which he stated that he had purchased the business.

Defendant's solicitor submitted that there was no case, and contended that laudanum was not a poison to which the preventive part of the section applied, and that the defendant was only manager for Mr. Moyle, who was a duly registered chemist.

The defendant was called as his own witness. He said he carried on the business as manager for Mr. Moyle, and not for his own profit. When the poison was sold he labelled it with the name of the owner of the business. The owner's name was put on the window on April 22. When prescriptions were sent to 1, Lewis Terrace, including poisons in the first part of the schedule, he sent them to Mr. Moyle, at Hammersmith, to be dispensed there, and they were sent back to him; he did this to comply with the Act.

Cross-examined: He bought the business on April 22, of Dr. Priestly, and sold it on the same day to Mr. Moyle. This was by agreement, but he had not got it with him. On the centre pane of the shop window there appeared the name "Joseph Moyle and at Hammersmith;" over the top of the shop "Chemist and Dentist" appeared and the name "The Battersea Co-operative Pharmacy." Moyle's name did not appear over the shop; it appeared half way down the centre pane, "Joseph Moyle, Surgeon Dentist, and at Broadway, Hammersmith." On labels the name "Joseph Moyle, Chemist, Golden Key, 27, Broadway, Hammersmith," only appeared. Moyle did not use the address "1, Lewis Terrace" on labels.

Mr. Joseph Moyle, called on the part of the defendant, said he was a registered chemist, and carried on business at Hammersmith and at 1, Lewis Terrace, York Road. The business at 1, Lewis Terrace was his own and he took the profits. Defendant had no interest beyond being manager. He acquired the business on April 22 last. Defendant always sent over to him when the prescriptions contained poison.

Cross-examined: He had sent goods himself to the shop when wanted. If defendant ordered goods he did it on his own responsibility. He never instructed defendant to do so. The landlord held him responsible for rent. He agreed with defendant's evidence as to the manner in which his name appeared. The words "Chemist and Druggist" did not appear upon the window pane in conjunction with his name, but they did appear over the shop, where there also appeared the name "Battersea Co-operative Pharmacy."

Without calling upon the plaintiff's counsel the Judge decided upon oral evidence and letters put in and admitted that the defendant was carrying on the business for his own profit, and that the names over the shop and upon the window were quite separate and distinct, and that plaintiffs should have judgment for the £5 penalty with costs upon the higher scale.

ANSWERS TO CORRESPONDENTS.

Erratum.—On p. 79, col. ii., line 14 from bottom, for "snow-leaved helleborine" *read* "sword-leaved helleborine;" line 36 from bottom *for* "*Scolopendium*" *read* "*Scolopendrium.*"

S. E. R.—The name "ichthyol" in the prescription is that of a special preparation, said to be obtained as a product of the distillation of some bituminous substance; it has been recommended for the treatment of certain affections of the skin. Some information respecting it may be found under the "The Mouth" in the *Pharm. Journal* for March 31, 1883, p. 798. Your letter shall be forwarded as you desire.

G. Burrell.—Your suggestion has been brought under the notice of the proper authorities and will receive attention.

J. E. Saul.—The subject of your note will no doubt be considered by the Council at its meeting on Wednesday next.

C. Parkinson.—The following recipe has already appeared in the *Pharmaceutical Journal*:—*Chilli Paste*: Ol. Oliv. Pur., 2 lbs.; Capsici Contus., ½ lb.; Cetacei, 6 ozs.; Ol. Lavand., q. s. Boil the chillies in the oil for seventy-two hours, add the spermaceti previously melted, let the mixture stand till nearly cold and then add oil of lavender to scent sufficiently,

H. B.—See the articles and letters on the general subject by Messrs. Willmott and Maben, in the last volume of the Journal.

J. W. Aplin.—(1) It is impossible to say with certainty, but possibly the tincture would only be injured in respect to the characters mentioned. (2) We are unable to advise you on this point.

An Associate.—A description of the manufacture of oleo-margarine will be found in the *Pharmaceutical Journal* for August 21, 1880, p. 152.

Cymro.—Both forms have their advocates, the arguments being based upon different views as to the construction of the last line.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Bennett, Hutchinson, Dyer, Kinninmont, Wheldon, Lloyd, Associate, J. M. W.

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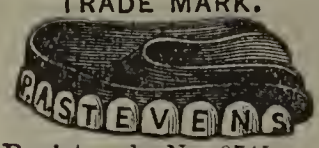

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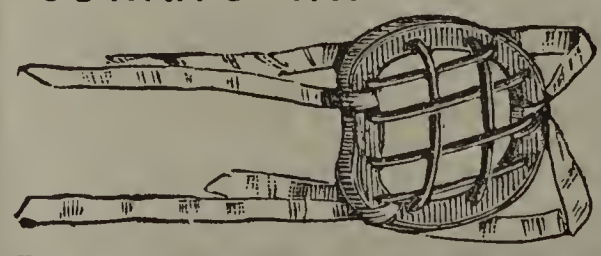

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The Favourite Beverage for Lunch, Dinner or Supper Parties. Eminently Wholesome. No table should be without it.

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A Real Summer Delicacy. Cooling and Refreshing in Water. Effervescing in all Aerated Waters. Effectually Quenching Thirst.

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The favourite Temperance Beverage; Delicious, Cooling and Refreshing. Entirely Free of Alcohol. Eminently Wholesome.

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An excellent Substitute for the Lemon as a flavouring in Summer Drinks, Claret Cups, &c. Cooling and Refreshing.

ROSE'S LIME JUICE CORDIAL.
Is highly Medicinal, Cooling and Purifying the Blood. An excellent Stomachic, Assisting Digestion.

ROSE'S LIME JUICE CORDIAL.
No Beverage has received higher recommendations from the Medical Profession as eminently wholesome.—See *Lancet*.

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The Family Dinner Table has additional attractions when supplied with Rose's Lime Juice Cordial in water.

ROSE'S LIME JUICE CORDIAL.
Non-Alcoholic. It has now become the favourite Beverage all the year round.

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Sold everywhere. As a protection against imitations, Purchasers should order "ROSE'S LIME JUICE CORDIAL."

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It has been decided in various Chancery Suits that ROSE & CO., LONDON, are the original introducers of LIME JUICE CORDIAL.

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Exported to all parts of the World. Special Export Terms. Wholesale Stores, 11, CURTAIN ROAD, LONDON; and at 41, MITCHELL STREET, LEITH.

SUGAR COATED PILLS

R. HAMPSON prepares the Pills of the Pharmacopœia, and a great variety of Pills from useful formulæ. The Pills are made of the best ingredients, and being *quickly* diffusible always give satisfaction. A Price Current and sample post free. Supplied direct or through the Wholesale Houses. Special quotations for large quantities.

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LABELS CHEMISTS' SURGEONS' MINERAL WATER LABELS LABELS OF ALL KINDS.

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Great Saving in the purchase of New Medical Dispensing Bottles and Phials at the Islington Glass Bottle Company (H. HARRIS & CO., Proprietors), 153, Upper Thames Street, City, London, E.C.

Before ordering the above see our newly Reduced Price List, which is forwarded free on application; also for Blue Poison Bottles, Round Shouldered Phials, Castor Oil Bottles, Flat Pannelled Bottles, Direct Square Dispensing Bottles, Citrate of Magnesia, Essence Bottles, Pomade Bottles, and all other kinds.

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SAVARESSE'S CAPSULES

of membrane, each containing 15 drops Pure Maranham
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or, also of membrane, each containing 10 drops Purest Yellow
SANDAL WOOD OIL.

The efficacy of these valuable medicines is due to the ABSOLUTE purity of the Balsam or Oil, and to the very GRADUAL solvability of the membrane as compared with gelatine. Copaiba, 2s. 6d., 18s. doz. Sandal, 4s. 6d., 36s. doz. EVANS, LESCHER & WEBB, London; EVANS, SONS & CO., Liverpool.

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These FATS, *being absolutely* PURE, *and free from* SALT, CHEMICALS, *or* WATER, *are*
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Manufacturers of MUSK, GLYCERINE, ROSE, BROWN WINDSOR, BRAN, TAR, SKIN, TOILET, ELDERFLOWER, OATMEAL, HONEY, ALMOND, and all other kinds of **FANCY SOAPS**, in Squares, Tablets, or Bars. VIOLET POWDER, POMADES, COSMETIQUES, &c.

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IN 1 OZ AT 2/6 — 2 OZ 4/6 — 4 OZ 8/6 — 8 OZ 16/6 — 16 OZ 32/- BOTTLES EACH NETT
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SODA WATER. LEMONADE.
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SELTZER WATER. *GINGER ALE.
* *The best Ginger Ale in the Market.*

These Aërated Waters have stood the test for upwards of 50 years, and are second to none for Purity and Quality. Sold by all respectable Chemists, Wine Merchants, Hotels, &c. All Corks are branded "J. H. THOMAS & SON, Boston." For Terms and Show Cards apply to

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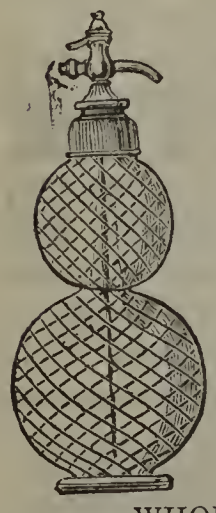

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8-pint, wire, 30s.; cane, 32s.
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For orders of three, 15 %. Large discount allowed off quantities upwards. Strongly silver-plated top, 5s. extra.

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3-pint size in handsome labelled boxes	21s.	18s. 6d.
5-pint do. do.	30s.	26s. 0d.
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Clear or coloured glass, viz., red, blue, green, or yellow, warranted pure ENGLISH BLOCK TIN TOPS, with piston or cap, 22s. 6d. *per dozen or* £13 10s. *for quantities of not less than one gross.* PACKING IN CASK 5s. PER GROSS. The Name marked on the metals free of charge for quantities of not less than one gross. The Name engraved on the glass with Trade Mark, 1s. 6d. and 2s. per dozen extra. Catalogue on application.

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A REMEDY FOR
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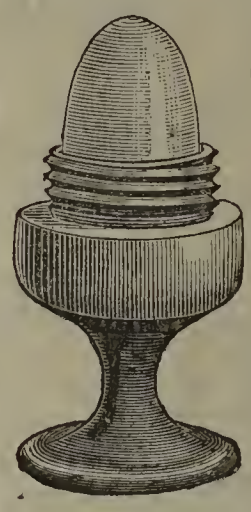

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The lids remove, and the box serves as a holder for the Cone.
Fancy Hardwood Boxes, 9s. per dozen.
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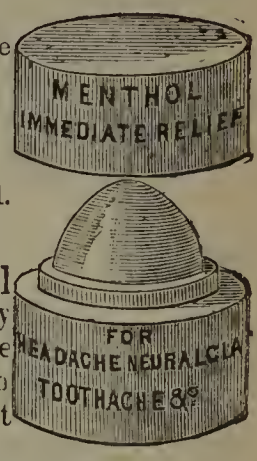

The **Pure Menthol Cones** manufactured by us are exempt from the Medicines' Act, and can be sold without a Patent Medicine Stamp.

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Proprietors of MYOCOM FLY GUM, *in tins at* 1/-, 2/6 *&* 5/- *each.*

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TRADE MARK— "BLOOD MIXTURE."

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BLOOD MIXTURE.

The Great Blood Purifier & Restorer.

The celebrated Cure for Scrofula, Scurvy, Skin and Blood Diseases, and Sores of all kinds. Wholesale of all Patent Medicine Houses, at 24*s.* and 108*s.* per dozen, less the usual discount.
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WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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INTERMEDIATE TEA, 2s. per lb.
BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—
AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

The Middlesex Hospital Medical SCHOOL.—The WINTER SESSION will open on October 1st, with an Introductory Address by Dr. David W. Finlay, B.A. After the Lecture, the Prizes awarded during the past Winter and Summer Sessions will be distributed.
Two Entrance Scholarships, value £25 and £20 per annum, tenable for two years, and an Entrance Science Scholarship, of £50, will be competed for on September 29th and following days.
For Prospectus or further information apply to the Dean, or the Resident Medical Officer at the Hospital.

St. Thomas's Hospital Medical School,

ALBERT EMBANKMENT, LONDON, S.E.

The WINTER SESSION of 1884-5 will commence on OCTOBER 1st, when an Introductory Address will be delivered by Sir J. Risdon Bennett, M.D., F.R.S., at 3 p.m.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle.

W. M. ORD, Dean.

The London Hospital and Medical

COLLEGE, Mile End, E.—The SESSION 1884-5 will commence on Wednesday, October 1st, 1884, when the Prizes for the past Session and the Nursing Probationers' Prizes will be distributed at 8 p.m., by the Right Hon. the Lord Mayor, M.P., accompanied by the Lady Mayoress. There will be a Conversazione, to which all past and present students are invited. FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30 and £20, will be offered for competition at the end of September to new students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All Resident and other Hospital appointments are free, and the holders of all the Resident appointments are provided with rooms and board entirely free of expense. The Resident appointments consist of Five House-Physiciancies, Five House-Surgeoncies, and One Accoucheurship; Two Dressers and Two Maternity Pupils also reside in the Hospital. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, District, East London, and South Eastern Railways have stations within a minute's walk of the Hospital and College.

For prospectus and particulars apply personally or by letter to Mile End, E. MUNRO SCOTT, Warden.

VICTORIA UNIVERSITY.

DEGREES IN MEDICINE AND SURGERY.

Full particulars as to Courses of Study, Examinations, &c., may be obtained from the Registrar. An Entrance Examination in Arts (recognized by the General Medical Council) will be held in the Owens College on Monday, October 6th, and following days. Candidates will be required to pay a fee of £1, and to furnish the Registrar with a certificate from their last instructor or some other suitable person, stating that they are proper persons to be admitted to the Examination. Attendance to receive fees and to enter students for the Examinations on September 30th, October 1st and 2nd, from 10 a.m. to 1 p.m., and from 2 to 4 p.m.

A. T. BENTLEY, M.A., Registrar.

OWENS COLLEGE, MANCHESTER.

Prospectuses of the Pharmaceutical Courses in the Session 1884-5 will be forwarded on application.

J. HOLME NICHOLSON, Registrar.

TO CHEMISTS AND DENTISTS ON THE DENTAL REGISTER.

CANDIDATES for L.D.S. Diplomas of the Royal Colleges of Surgeons, Dub., Edin., or Glas., successfully prepared by an experienced teacher. Postal. Address, C. BENNETT, Esq., 3, Clevedon Villas, Bronshill Road, Torquay.

THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

At the Examinations held in London this month, 5 Major candidates from this School presented themselves. The following 4 passed:—

Mr. CLOWER	Mr. HANSON
,, GRADIDGE	,, SALMON

17 Minor candidates were recommended to present themselves for examination. The following 13 passed:—

Mr. ADAMS	Mr. GRAY
,, ASTON	,, JAMES
,, BAYLEY	,, JOINT
,, GIBBONS	,, HUGHES
,, FISHER	,, STEVENS
,, FLOWER	,, TIMM

Mr. WATSON

PRELIMINARY EXAM. NO PASS, NO PAY.

STUDENTS who really desire to be thoroughly and carefully prepared, so as to ENSURE SUCCESS, should study under the **NO PASS, NO PAY, POSTAL SYSTEM.** For particulars enclose stamped envelope to TUTOR, care of Mr. Filtness, Rotherfield. Reference to pupils who passed the last examination. Metric System Notes, 1s. The inflexions of each word in Cæsar, 1s.

PHARMACEUTICAL PRELIMINARY, LONDON MATRICULATION, AND ALL MEDICAL PRELIMINARIES.

RAPID and thorough preparation, privately and in class. Postal Tuition for these Examinations and Beil Scholarship. For particulars, enclose stamp, Mr. A. DAWES, 1st B.A. Lond., Adderstone, Vardens Rd., New Wandsworth, S.W. (close to Clapham Junction Station.)

PRIVATE TUTOR

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(*From the Royal School of Mines*),

6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.

As each Student is taught and works *separately*, entry may be made at any time. Individual personal attention. No Demonstrators. Postal teaching. Enclose stamp for terms, &c.

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STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, Gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium, 100 Plants, 5s.

WESTMINSTER COLLEGE

TRINITY SQUARE, BOROUGH, LONDON, S.E.

The next Session will commence on Monday, September 1st.

FEES:—

To the October Examination	...	£5 5s.
To the December ,,	... ...	£8 8s.
Six Months' Course	... ...	£10 10s.
Twelve Months' Course	... ...	£15 15s.

At the Pharmaceutical Examinations held last month, the following 28 Students of the Westminster College were successful in passing the MINOR Examination:—

*Mr. A. BANKS	Mr. R. M. LEWIS
* ,, W. BARKER	* ,, C. O. MORRISON
* ,, T. N. BROOKE	,, G. MOOR
,, B. H. BUTLER	,, G. NEALE
,, W. CLARKE	,, J. NEWTON
,, C. ELLIS	,, F. ROOKLEDGE
,, W. H. GODSLAND	,, F. T. SANDERS
* ,, E. E. HALL	,, B. SMITH
,, J. H. HOPPER	,, J. STURDY
,, A. J. HEMSTEAD	* ,, W. SUMNER
* ,, J. HULLAND	,, T. E. TAYLOR
* ,, S. HUGGINS	,, A. WALDRON,
* ,, G. JACQUES	,, H. P. WITHERS
* ,, J. K. JONES	,, H. E. YOUNG

PRELIMINARY.

*Mr. R. COLWILL | *Mr. N. COUVE
Mr. A. T. RILEY.

* Resident Students.

BOARD AND APARTMENTS FOR STUDENTS.

In order to save gentlemen the trouble and uncertainty of obtaining comfortable lodgings, Mr. Wills (Principal) has undertaken to provide apartments for a limited number in the immediate neighbourhood, where every comfort and cleanliness is insured. All such students meet at Mr. Wills' private residence for meals.

Terms on Application.

For Prospectuses and other information, apply to
Messrs. WILLS & WOOTTON.

LIVERPOOL SCHOOL OF PHARMACY.

36, Oxford Street, Liverpool.

Principal: J. S. WARD, Ph. Ch., M.P.S.

(*Prize Medallist and South Kensington Prizeman.*)

The next session will commence on Monday, September 1st, with Two Courses of Lectures, one for the October candidates, and the other a full course extending over until the December Examination.

Three out of Four of those who have passed from this School at the recent Examinations have been successful on their first attempt.

A new Prospectus, with full particulars of the School premises, curriculum, fees and testimonials, will be forwarded on application.

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GUARANTEED CIRCULATION

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Assistants Wanted, Apprenticeships Wanted, Businesses for Disposal, Wanted to Purchase, also Advertisements of a general character (in column).—Seven lines (50 words) or less, 4*s.* 6*d.* Each line (seven words) extra, 6*d.*

Special terms for **Assistants seeking Engagements** *only.*—Four lines (28 words) or less, 2*s.* 6*d.* Each line (seven words) extra, 6d.

Postage stamps *cannot be received*, but payment may be made either by **Cash** in a Registered Letter, or by **Cheque** crossed London and County Bank, by **Postal Order**, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL.

Advertisers are requested to observe:—

1.—That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

2.—That letters addressed to initials or to fictitious names at a Post Office are not taken in, but are at once sent back to the writers by the Post Office Authorities.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers.

Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

J. & A. CHURCHILL, 11, New Burlington St., London, W.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

FOURTEENTH SESSION, 1883-4.

Entries now begun for the term commencing Sept. next.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 47 out of 51 Pupils passed the last Examinations.

LONDON MATRIC.

Legal, Medical, Pharmaceutical, and Exams.

BUTLER SMITH, B.A., 1st B.Sc. (Lond.), assists PUPILS in reading up, day and evening.

POLYTECHNIC, REGENT STREET, W.

ENGAGEMENTS WANTED.

AS ASSISTANT. Age 24. Fully qualified. Midlands preferred. Disengaged. J. H. GRADIDGE, Carclew St., Truro.

AS MANAGER, or in any position of trust, in a good class business. Age 30. Single. Qualified and thoroughly competent. MINOR, 12, Earl's Court Rd., Kensington, W.

AS LOCUM TENENS or TEMPORARY, for a fortnight. Disengaged August 15th. Age 32. 16 years' experience. Excellent references. W. M. BAKER, 47, Westow St., Upper Norwood, S.E.

AS LOCUM TENENS or MANAGER, by a Pharm. Chemist, with first-class experience and highest references. BETA, care of Mr. Burke, William St., Windsor.

AS MANAGER or outdoor ASSISTANT. Permanent or temporary. 25 years' experience. Registered. Married. Good references. Now disengaged. Town or suburbs preferred. CHEMIST, 30, Esmeralda Rd., Bermondsey, S.E.

IMMEDIATELY.—Age 27. As good JUNIOR or SECOND. Height 5ft. 7in. Accustomed to light Retail and Shipping. J. B., 18, Lower Meddon St., Bideford, N. Devon.

ASSISTANT, two months (or permanency if spared fortnight beginning of October). 7½ years' experience, first-class Retail and Dispensing. 'Age 24½. Excellent rerefences. WALTER ADAMS, 1, Brighton Rd., Southampton.

THE Daughter of a Chemist, who has passed the Preliminary, desires an engagement as DISPENSER. If in a doctor's family, willing to be useful in other ways. Miss HART, 220, Marylebone Rd., London.

AS MANAGER, England or abroad, where able to have my own Apprentice, and where an energetic man for pushing modern trade is preferred. ANONYMOUS, 10, Cranberry Avenue, Southampton.

ABOUT the 23rd inst.—As Junior ASSISTANT in a good class business. Age 23. Please state particulars to A. B., Mr. Bemrose, Dawley, Salop.

AS ASSISTANT. 8 years' experience in good class Retail and Dispensing. Age 24. Height 5ft. 8in. Disengaged. W. W. THOMAS, Post Office, King's Rd., Southsea, Hants.

AN experienced ASSISTANT desires permanent engagement by August 22nd. Passed Major. Age 34. Salary moderate. N., 13 Charles St., St. James', S.W.

AS JUNIOR. Age 22. Height 5ft. 9in. 6 years' experience. Good references. Disengaged. B., 9, Upper Rock Gardens, Brighton.

AS ASSISTANT, for a few weeks, with a view to purchase a business (Retail and Prescribing) returning at least £750. Letters treated in confidence. A good country town not objected to. STATIM, care of E. Richards, Esq., 48, Victoria Rd., Kilburn.

AS MANAGER, or for Branch, town or country. Age 33. Single. Qualified. Varied experience. Disengaged. P. C., 78, Wells St., Oxford St., London, W.

AS MANAGER of good Branch shop, or other responsible position. Disengaged August 11th. Age 35. Married. Good references. MINOR, Mr. Knight, Chemist, Wincanton.

AS JUNIOR, in good Retail and Dispensing business. London or suburbs. Age 21. 3 years' character. T. H. DEWEY, Mr. Poyser, Chemist, Merton Rd., Wimbledon.

LOCUM TENENS.—Now disengaged. Age 29. Qualified. W. H. G., care of Wyleys & Co., Coventry.

ENGAGEMENTS WANTED.

MANAGEMENT of Branch or Senior ASSISTANTSHIP required by a Registered Chemist of 17 years' experience. Can Extract Teeth. Married. Height 5ft. 10in. Can be highly recommended. Has had sole charge for 3 years consecutively. ASSOCIATE, 31, Chapel St., Edgware Rd., W.

AS JUNIOR, in good London house. Age 21. Minor qualification. Good references. London and Bristol. A. J. G., 33, Triangle, Bristol.

ASSISTANTS WANTED.

JUNIOR or IMPROVER, in a Chemist's and Bookselling business. No heavy trade nor Sunday work. Good character indispensable. Apply, giving references, age, and salary required, to R. H. TREWEEKS, Pembroke.

FOR about four months from August 25th, whilst Assistant passes Minor, a thoroughly trustworthy JUNIOR, in a good general business. Out-door. Must be a careful and neat Dispenser, active, obliging, and have passed Minor. Unexceptional references required. Liberal salary to good man. Full particulars to JOHN KEMP, Chemist, Cornhill, Lincoln.

HEAD COUNTERMAN or WAREHOUSEMAN, accustomed to the Wholesale Drug trade. Apply, by letter, stating age, experience, and salary required, to X. Y. Z., care of Mr. C. R. Brown, 40, Sun St., Finsbury, E.C.

IN or out-door. An active obliging ASSISTANT. Thoroughly trustworthy and able to take charge of a light class business. Age about 26 preferred. Applicants will please state salary expected, all previous engagements, and enclose photo., to CHEMIST, Messrs. Edwards & Son, 157, Queen Victoria St., E.C.

EDWARD BROWN, Pharmaceutical and Dispensing Chemist, 159, Woodhouse Lane, Leeds, has a vacancy for an IMPROVER, who has been two years in the business, and can be well recommended. No premium required, and no salary given for first year.

AN ASSISTANT, about 24 years of age, in a good class business. Apply, with usual particulars, enclosing photo., to W. T. FROST, 125, Lee Rd., Blackheath, S.E.

A JUNIOR, with some experience, for a light London Retail. Time for study if required. Also an ASSISTANT, requiring moderate progressive salary, for an easy Branch. Address, with carte, salary, age, and references, NEMO, Sanger & Sons, 489, Oxford St., W.

IMMEDIATELY. — JUNIOR or IMPROVER. Select country business. No heavy trade. Hours short. Comfortable home. Time for study if required. State full particulars to EDGAR NEALE, Chemist, Chippenham.

IMMEDIATELY.— A qualified ASSISTANT. Apply stating salary (which must be moderate), and send photograph to SAFFERY, Chemist, Sheerness-on-Sea.

A JUNIOR ASSISTANT. In-door. Must have good references. One having a knowledge of Postal duties preferred. Apply, personally if possible, S. DEAN, 320, Roman Rd., Bow, E.

JUNIOR.—In about a week or so, for Mixed country business. Willing to make himself generally useful. Good home and ample time for study. Character must bear strictest investigation. Apply, with full particulars and references, to RICHARD WHITTON, Chemist, Market Weighton.

A GOOD JUNIOR, 22 to 23 years of age, with good references and fair experience. Address, CHEMIST, 101, Stanley Rd., Liverpool.

AT once.—An ASSISTANT, accustomed to a good class country business. Must be a neat and accurate Dispenser. Apply, with usual particulars, enclosing carte if convenient, to J. HINKS, 25, Cross, Worcester.

ASSISTANTS WANTED.

JUNIOR, where two Assistants are kept. Must have had experience in a good class country business. No Sunday work. Send references, salary required, and when disengaged, to W. SLADGWICK, Andover.

AN ASSISTANT for a light Retail business near London. A good opportunity for one who has served his apprenticeship and desires time for study. Must be steady, willing and obliging. To save time and unnecessary writing please give full particulars, enclosing photo., or personally to J. HOLLOWAY, Chemist, Wood Green, N.

ASSISTANT.—For better class country market town business, competent, with practical business habits and address. Equal to take management during absence. Hours 8 till 8. Sunday duty nominal. Apply, with all detail, to C., Barron, Harvey & Co., Giltspur St., London.

IMMEDIATELY.—JUNIOR or IMPROVER (who has passed Preliminary exam.). Age about 19 to 20. For a good class suburban business, where another Assistant is kept. State height, salary, and usual particulars, enclosing carte (to be returned), or personally preferred, to H. SAXTON, Chemist, High St., North Finchley, N.

EARLY in August.—An ASSISTANT in a respectable Mixed country business. He must be well recommended, and a good Dispenser. Apply, stating age, salary expected and references, to G. COTTRILL, Shepton Mallet.

AN out-door ASSISTANT, accustomed to first-class Dispensing. State salary required and full particulars, to JOHN FIELD, 56, Marine Parade, Brighton.

IMMEDIATELY.—Junior ASSISTANT or IMPROVER, of steady business habits, for a Mixed country business. Must be active and obliging. Every home comfort. Good references indispensable. Apply, stating age and salary required, to R. ROBERTS, Chemist, Norwich.

SOUTH-WEST of Ireland.—Immediately. In a first-class Drug house, a JUNIOR. He must be a smart man and a correct Dispenser, also a good and neat writer. Hours of business, 8 to 7, with alternate evenings for recreation and one hour alternate mornings. Two other Assistants kept. Apply to ERIN, care of Southall Bros. & Barclay, Birmingham.

BY the 8th of August.—To fill vacancy during holiday, for about three weeks. An ASSISTANT accustomed to light Retail and Dispensing. Please state full particulars as to salary, &c. Address, T. H. WOOLSTON, Chymist, Northampton.

EDWARD BARNES, Chemist and Dentist, High St., Godalming, requires a trustworthy qualified ASSISTANT. References must be first-class. Salary £50. In-doors. State age, height, and enclose photo. A JUNIOR or TURNOVER also required. A good opportunity for one requiring time for study.

A JUNIOR ASSISTANT as Improver for the laboratory; also a JUNIOR who writes a good hand, to keep the books and assist at the Dispensing counter. Apply, stating age, height, and previous experience, to GIBBS & GURNELL, Ryde.

JUNIOR ASSISTANT required for a country business in an agricultural and manufacturing neighbourhood. Apply, stating age, height, references, salary required, and enclosing carte de visit, if convenient, to J. A. LANSDALE, Chemist, High Wycombe, Bucks. N.B.—Member of a Christian church preferred.

IMMEDIATELY.—A young man who has been accustomed to Dispensing as an IMPROVER or Junior ASSISTANT. Time for study if required. Apply to PENNEY & BOTWOOD, Pharmacists, High St., Poole, Dorset.

AN ASSISTANT. Apply, stating age, height, salary and references, to J. A. SEYS Chemist, Newport, Mon.

ASSISTANTS WANTED.

DISPENSER at the County Asylum, Cane Hill, Purley, Surrey. Must be duly qualified by the Pharmaceutical Society. Applications, enclosing photo. and copies of testimonials to be addressed to the MEDICAL SUPERINTENDENT, as above.

MR. PHILLIPS, Pharmaceutical Chemist, Broadway, Ealing, W., has a vacancy for a qualified gentlemanly ASSISTANT, age not less than 23, who has been accustomed to a good class Dispensing business. Personal application desirable, but applications may be made by letter, in which case carte must be enclosed, which will be returned.

FOR September 1st.—In consequence of the large number of entries for the coming Session, Messrs. WILLS & WOOTTON will require two extra ASSISTANTS in the Laboratory. Hours, 1.30 till 4 p.m., Saturdays excepted. Good salary. Major men preferred. Apply to Westminster College, Trinity Sq., Borough, London, S.E.

IN a town, of a winter season, in the South of France.—An English ASSISTANT, who can speak French. Age not less than 25; thoroughly understanding English Pharmacy. Must be steady and respectable looking. Apply to X. Y. Z., care of Barron, Harveys & Co., Giltspur St., London, E.C.

A DISPENSING ASSISTANT, age not under 22. Apply, giving full particulars as to qualification, experience and former employers to CLAY & ABRAHAM, Bold St., Liverpool.

DYSON & ARKINSTALL, 35, Gloucester Rd., S.W require an ASSISTANT with Minor qualification.

FOR August 14th.—An ASSISTANT of good appearance and address for a Dispensing and Retail business of the best class. Two and an Apprentice kept. Apply, inclosing carte, if possible, and stating previous experience and salary required, to EDMD. PEARSON, Market St., Nottingham.

IMMEDIATELY.—An ASSISTANT for general Retail, Prescribing and light Dispensing trade. Apply, with full particulars, enclosing photo. C. HEFFORD, Pharmaceutical Chemist, 21, Queen St., Derby.

JUNIOR ASSISTANT.—Must be well up in Dispensing and a good Counterman. State salary, experience, and when at liberty. Also vacancy for an APPRENTICE. Premium moderate, will be returned as salary. Apply to J. H. WALKER, Seacombe, Cheshire.

A FIRST-CLASS ASSISTANT to Chemists' business. Preference given to one with a knowledge of Mechanical Dentistry. Send photo., references, when disengaged, salary required, &c. 53, Bucks Rd., Douglas, Isle of Man.

APPRENTICE.—A vacancy occurs in an old established Family and Dispensing business, situated in the North of London. Every facility will be given for thoroughly learning the business, with ample time for recreation and study. Moderate premium. Address, P., care of Messrs. Hewlett, Charlotte St., Great Eastern St., E.C.

JUNIOR ASSISTANT, by ROBERTS & Co., 76, New Bond St., W. Minor qualification necessary.

IMMEDIATELY.—In-door. £40 per annum. An active, obliging, gentlemanly ASSISTANT. One who has been accustomed to a good class Dispensing and Retail business. Able to be left in charge occasionally. Must be well recommended. Send experience, age, height, photo, to be returned, F. GLANVILLE, 317, Fulham Rd., South Kensington, London.

OUT-DOOR.—Immediately.—An active and obliging ASSISTANT, single, for a brisk ready money business where 3 are kept. Apply, with carte de visite, stating age, height, and experience, to E. J. KITSON, City Drug Stores, Worcester.

ASSISTANTS WANTED.

IMMEDIATELY.—A Junior ASSISTANT, accustomed to first-class Dispensing. Apply, GUYER & SHAPLEY, Torquay.

IMMEDIATELY.—A competent qualified ASSISTANT, single, to Manage a Branch in the N.W. district. One seeking a permanency. Apply to W., Messrs. Hodgkinson & Co., 198, Upper Whitecross St., E.C. Also a vacancy for an APPRENTICE.

BY a Pharmaceutical Chemist, a thoroughly qualified ASSISTANT as leading Counterman in a first-class establishment. Experience and good address essential. Applications by letter addressed T. R., care of Messrs. Hodgkinson, Stead & Treacher, 198, Upper Whitecross St., London, E.C., stating height, age, &c., and salary required, in-door.

A STEADY trustworthy ASSISTANT to Manage a Branch business. Must be competent to Prescribe and Extract Teeth. Apply with full particulars, stating salary required (out-door), age, height, experience, and when disengaged, CHEMIST, 39, Redcliff Hill, Bristol.

OUT-DOOR.—An active and obliging Junior ASSISTANT. Good references indispensable. Apply with all particulars, to A. WRIGHT, 109, High St., Lowestoft.

LA Pharmacie Continentale, 116, Boulevard Haussmann, Paris, demande un employé anglais Connaissant le français et la pharmacie française.

TWO ASSISTANTS, well up in Dispensing and good Counter hands. £50 to Senior not under 23, and £40 to Junior not under 21. Both with Minor qualification. State age, height, and all previous engagements, with carte, to be returned, or apply to D. THOMSON, 137, Queen's Cres., Haverstock Hill, London.

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MESSRS. GURDEN BERDOE have for transfer:—HERTS. Retail and Prescribing trade. Rent £26. Full prices. Returns £450. £350, or offer. HARROGATE (near). First-class Dispensing trade. Returns £700. Full prices. Thoroughly genuine. For £500, or offer. NORTHAMPTON. Retail and Dispensing trade. Best position in town. Returns £600. For £550. Less than value. NORFOLK (coast). Same hands 44 years. Retiring. Retail and Dispensing. Returns £700. Price, with freehold, £1650. £1000 can remain. Opportunity seldom met. ESSEX. Totally unopposed. Full prices. Pure Drug business. Returning £11 weekly. Can be increased by adding Dentistry and Mixed trade. Rent £22. Good house and garden. £400. LONDON, N. One of the most reliable ever offered. Solely through illness and retiring. Cash required, about £500. S.W. Retail and Dispensing. Showing £650 net profit. Trial allowed. Owner retiring. £1100. N.E. Facing station. Returns £500, and neglected. For £375. Another, returning £10, for £250. Please apply, 30, Jewry St., Aldgate, City.

RAMSGATE.—A genuine BUSINESS. Profits, £6 to £7 weekly. Several good Proprietaries. A good corner. Anyone in want of a business will find this worth their while. Price £300, or fair offer. Apply, BAKER, Chemist, Ramsgate.

IMMEDIATELY. — Good BUSINESS, in charming suburb, South London. Close to rail. Well fitted and stocked. Returns £300. Lowest price £200. Address, C. B., Langton & Co., 230, Upper Thames St.

SOUTH Wales.—An exceptional and rare opportunity. A profitable BUSINESS, in a thickly populated part of a manufacturing town. Country, town and shipping trade might be combined by an energetic man. Price £350. For the convenience of any young man wishing to start £100 cash and remainder by instalments to suit purchaser. Welsh not essential. DRUGGIST, care of Messrs. Barclay & Sons, 95, Farringdon St., E.C.

BUSINESSES FOR DISPOSAL.

SEASIDE (Morecambe).—A cash Retail and Prescribing BUSINESS, in the centre and best position of town. Shop well fitted. Full prices. Can be seen any day. This is an opportunity rarely to be met with, proprietor giving all his time to Dentistry. Apply for particulars, J. R. BIRKETT, Chemist and Dentist, 29, The Crescent, Morecambe.

RARE opportunity. — Retail and Prescribing BUSINESS. Established 20 years. Returns £14 weekly. Goodwill, including two specialities, £50. Stock, &c., valuation, or £600 all. No opposition, best situation in market place. Rent of shop and house £60. The district is populous and manufacturing. Apply, Messrs. GLEDHILL, Pharmaceutical Agency, 416, Strand, W.C.

BRISTOL. — Genuine old-established well situated Dispensing, Prescribing and RETAIL. All ready money. Good shop and house. Stock large and new. Premises in excellent condition. Rent moderate. Price £350 to £400 as may be arranged to suit an immediate purchaser. Satisfactory reasons for disposal. Particulars of PRIEST, 16, Glenn Park, Eastville, Bristol.

SOUTH-EAST Coast.—Immediately. Old-established Family BUSINESS. Principal street. Rent £25. Price £100. Good prices. Corner shop. Was a short time back worth £350. A bargain. Three good, well known Proprietary Articles. Excellent scope for Dentistry. Apply, STUBBS, High St., Deal.

TO Chemists and Dentists.—A good class Retail, Dispensing and Prescribing BUSINESS, established 7 years, in an increasing neighbourhood. 7 years' lease unexpired. Stock, fixtures and goodwill, cash price £350. Ill-health sole cause of leaving. In the hands of an energetic man would be capable of larger extension. Address, Mr. HUTCHINSON, 155, Winston Rd., Stoke Newington, N.

WILTS.—A small old-established light Retail and Agricultural BUSINESS, with several valuable Proprietary Articles attached. Good house and large garden. Stock and fixtures at valuation. No goodwill asked. CHEMICUS, 36, New Park St., Devizes.

ONE of the oldest established BUSINESSES in the Eastern Counties. In a small market town. To an energetic man, with capital, presents an opening seldom met with. No agents replied to. MAJOR, care of Messrs. Barron, Harveys & Co., Gilt-spur St., London.

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IMMEDIATELY.—A bargain. A small well-established BUSINESS, in a large and increasing neighbourhood of an important watering-place. Corner shop. Good reasons for disposal. For particulars, apply to A. S., 45, Kensington Rd., Southport, Lancashire.

DORSET. — Old-established Retail and Dispensing BUSINESS, with some Dentistry. Returns £850, at full prices. Large and convenient house, with stabling, coach and warehouses. Lease for 14 years. Good opening for Mineral Water trade. Address, ALPHA, 2, Belmont Villas, Exeter.

GENUINE cash BUSINESS. Pretty S.E. suburb. Prescribing and Retail. Very profitable. Returns £550. Profits over £300. Post Office pays half rent and taxes. Fullest investigation allowed. Must be sold. Letters, CHEMICUS, care of Battley & Watts, Cripplegate.

IN Liquidation.—With immediate possession, an excellent old-established country BUSINESS. 5 miles from any railway station. Apply to R. A. RAWSON, Tickhill, viâ Rotherham.

BUSINESSES FOR DISPOSAL.

IMMEDIATELY.—Dispensing, Prescribing, and very profitable light Retail BUSINESS, in Cheshire. Large commodious and well fitted shop. Principal thoroughfare. Low rent. Good living accommodation. Immediate sale being imperative, no reasonable offer refused. Stock removed if necessary. Special opportunity for young man just beginning. Investigation invited. Apply to CHESHIRE, Messrs. Woolley & Co., Wholesale Druggists, Manchester.

IMMEDIATELY.—An old-established BUSINESS, in one of the principal thoroughfares of Huddersfield. Must be sold. Proprietor having other business, is retiring from Retail. No goodwill. Full particulars on application. Address, CHEMIST, 24, Bath Bldgs., Huddersfield.

WANTED TO PURCHASE.

SMALL Chemist's BUSINESS, either seaside or country, with nice garden, cheap rent, easy terms; or would take Management. To live on the premises. Married. Thoroughly understands Homœopathy. MEDICUS, care of Mr. Hill, 2, High St., Thornton Heath.

FOR SALE.

A SPLENDID Specie Jar, Royal Arms, gilt cover, on mahogany, ebonised and gold embellished stand, extreme heighth 41in., a bargain; 1 pair do., on ebonised and gilt stands, extreme heighth 36in.; other sizes in stock; 2 pair swan neck Carboys and stands; a quantity of large pear-shape do.; Shop Rounds, blue and white Ointment Jars and Pots, Jujube Jars, and other fancy jars; 24-3, 4, and 5 grain Pill Machines, equal to new; outside Globe Lamp; Sponge Cases, A 41, A 42; a 12ft. Fixture, as Maw's fig. A 84; 2ft. long, 4ft. long, 6ft. long, 8ft. long, 10ft. long, 12ft. long mahogany fronted Drawers, glass knobs and glass labels (bevelled edge), with lockers for bottles under, 4ft. high. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

DISPENSING Screen, 5ft. 6in., with counter under, fitted with drawers and plate glass cases in front, a bargain; Dispensing Screens, 5ft., 6ft., 7ft., glass case at each side, with silvered plate-glass centre, with marble slab in front, with carved wood on top, 3ft. high, the cases at each side have plate-glass doors, with tablets on top, 2ft. high, inside each case fitted with silvered glass and shifting shelves; as fig A 53, 5ft. 6in. long, 7ft. 6in. long; as fig. A 54, 4ft. long; as fig. A 55, 5ft., 6ft., 7ft. 6in. long; Sponge Case, A 43; a Centre Case, 8ft. long, 5ft. wide, mahogany; a number of other size Screens and Cases, very cheap. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

FOR Sale. Plate-glass Counter Cases, as fig. A 2, 3ft. long, 4ft. long, 4ft. 6in. long; as fig. A 3, 3ft. long, 3ft. 6in. long; A 6, 4ft. long, 5ft. long, 6ft. long; as fig. A 7, 3ft. 6in. long, 6ft. long; as fig A 8, 5ft. long, 6ft. long; as fig. A 9; as fig. A 13, 4ft. long, 4ft. 6in. long; A 15, 6ft. 6in. long; A 16, 3ft., 3ft. 6in., 4ft. long; A 17, 4ft. long, 4ft. 6in. long; A 18, 5ft. long, 6ft. long, 7ft. 6in. long, 8ft. long, 9ft. long; Tooth Brush Case, A 9, A 10; Desk and Cases, as fig. A 30, 2ft. 6in. long, and 3ft. long, as fig A 31; Cigar Cases, A 34. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

MAHOGANY top Counters, fitted with drawers, 5ft., 6ft., 7ft., 8ft., 14ft., 18ft., and 20ft. long; 12ft. mahogany fronted Counter; 6ft. mahogany fronted Counter; 13ft. 6in. mahogany and plate-glass fronted Counter; 7ft. do., do.; a 16ft. long, 3ft. wide, Side Counter, fitted with drawers; a large quantity of second hand solid oak Drawers, in splendid condition, very cheap; a quantity of Shelving, Cupboard Doors, &c. E. NATALI 207, Old Street, near Pitfield St., London, E.C.

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3. YORKS.—Ready-money RETAIL. Returns £500 to £600 a year. Price £350. Trial allowed.
4. GLAMORGANSHIRE.—Returns about £9 a week. Price about £150—by valuation.
5. LONDON, S.W.—A very profitable Retail and PRESCRIBING. Returns about £600. Price £500.
6. LONDON, S.W.—An improving light Retail and PRESCRIBING, with some Dispensing. Returns about £650. Price £450.
7. ESSEX.—Light Retail, Prescribing and DISPENSING, with valuable Specialities. Returns between £600 and £700. Price £650.
8. WILTS.—Returns £540. Price £600.
9. LONDON, N.—Returns about £830. Price £760.
10. SCOTLAND.—Average returns £660. Price £550.
11. LONDON, S.W.—Returns £530. Price £450.

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SHOP and GARDEN, in the centre of one of the finest market towns in Devon. Population about 4000. Good neighbourhood, and only one chemist in the town. Rare opportunity for a man with good qualifications. For further particulars, apply, F. SAGE, 80 to 84, Gray's Inn Rd., London, W.C.

SYDNEY, NEW SOUTH WALES,

JUNE 11, 1884.

ENO'S FRUIT SALT IN EQUITY.

Before his Honor the PRIMARY JUDGE.

ENO *v.* DAVIES AND ANOTHER.

Mr. J. E. Solomon, Q.C., and Dr. Donovan, instructed by Mr. De Lissa, for the plaintiff; Mr. Owen, Q.C., and Mr. Nash, instructed by Messrs. Bull and Bull, for the defendants.

This is a suit instituted by James Crossley Eno, of Pomeroy Street, Hatcham, Surrey, England, to have the defendants, William Davies and James Channon, trading as William Davies and Co., Goulburn, and Harbour Street, Sydney, ordered to take a certificate of registration for a trade mark called "The Australian Fruit Salt" off the file at the Registrar General's office, and also to have them restrained by perpetual injunction from using the title to any other commodity. The plaintiff claimed that the trade mark was an infringement of his own, viz., Eno's Fruit Salt, Fruit Saline, and Fruit Powder. Consequential damages were also claimed. The defendant's mark was registered in this Colony two months before plaintiff's.

His Honour, in giving judgment, said he had no doubt that the case came within the principle laid down in the cases which had been cited wherein the Court enjoined a defendant not to continue the use of his trade mark. Although there were some important points of distinction in the goods, still there were points of resemblance which were calculated to induce persons to believe that they were obtaining the plaintiff's, when in reality they were buying the defendant's. The bottles were about the same weight and shape, and a purchaser of the defendant's would hardly know he had not got Eno's until he opened the package. Looking at the two bottles, he thought purchasers were exceedingly likely to be misled, because a man was not supposed to carry his last bottle with him in order to see that he was getting the same article, and persons buying were not supposed to be always suspicious that frauds were being practised upon them. He considered the term "fruit salt" sufficiently distinctive to be in itself a trade mark, and it had been proved in evidence that people generally asked for it by that name. The resemblance in the bottles and in the printing on the wrappers was so close that he regretted he could not say that it resulted from accident or was consistent with innocence. The distinctions seemed to have been carefully studied in order to escape, if possible, the results of imitation. The defendants had brought out their article just when the plaintiff's had taken a gigantic jump in public estimation, and had acted in such a way as to induce him to believe that they intended to lead the public to think they were buying plaintiff's goods when they were served with theirs. There was fraud which tradespeople unfortunately did not think much of, but which the Court always regarded with the greatest reprehension. He did not think the argument as to the second section of the Act had very much to do with the case. When the defendant registered he must have obviously known that Eno's Fruit Salt was in the market. He had no more right to register than he had to sell. He did not think the Act in any way interfered with the powers which the Court of Equity possessed before it became law. The Act had only been passed to afford a speedier and readier remedy to those who registered under it. The seventh section evidently contemplated that such a suit as the present one should be taken by a person who considered he had been wronged, as the plaintiff had been. He would grant the injunction in the terms of the prayer, restraining the defendants from using the trade mark, on the ground that it was an infringement on the plaintiff's prior and exclusive claim. He would order them to take such proper and necessary steps as were possible to take the certificate of registration off the file, but if a power greater than theirs stood in the way in the matter, they would be relieved from attachment. He did not see how he could compel the Registrar-General, who was an officer appointed by Parliament, to do a certain thing, to cancel the certificate, especially as he had not been made a party to the suit. The certificate, however, could be delivered up, because it was part of the subject matter of the suit. He would order the defendants to pay costs up to the hearing, and would direct an issue as to consequential damages to be tried before a special jury of four in the Jury Court on a day to be named. He would make the question of costs of these further proceedings dependent upon the result, because it might be that he would not give plaintiff his costs if he did not recover a substantial amount.

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 737.] SATURDAY, AUGUST 9, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

Page
Bartung. By W. T. Thisleton Dyer .. 101
The Estimation of Ethyl Nitrite in Spirit of Nitrous Ether. By T. S. Dymond 101
The Galenical Pharmacy of the New Pharmacopée Francaise (*continued*).. 102
The Alkaloids of Aconitum Lycoctonum 104
Syrup of Hypophosphites with Iron. By C. D. Randall 106
Detection of Brucine and Strychnine.. 107
Dietetic Delusions: their Deleterious Effects, and their Rectification. By R. M. Hodges 107
Circular respecting Patent Medicines.. 110
Petitions against the Medical Bill 110

EDITORIAL ARTICLES AND NOTES :—

The British Medical Association on Pharmacopœia Revision and Patent Medicines..... 111

Page
British Pharmaceutical Conference.. 112

Notes :—The Murder of a Pharmacist in Strassburg—The Ontario Register—The New South Wales Register—Assistants in Victoria—Compliment to Mr. Greenish—Fatal Explosion while preparing Oxygen—Persian Opium—Java Cinchona.. 112

TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY :—

Meeting of the Council :—
Medical Acts Amendment Bill.. 114
Election of Members, Associates and Apprentices 114
List of Superintendents of Written Examinations..... 115
Grants from the Benevolent Fund 116

Page
Prize Awards 117

PARLIAMENTARY AND LAW PROCEEDINGS :—

A Disputed Sweet Spirit of Nitre Case 118
Suicide by Morphia 118
Attempted Poisoning by Calomel.. 118

REVIEW :—

Latham's 'Formation of Uric Acid in Animals'..... 119

CORRESPONDENCE :—

Curious Use of Datura and Hyoscyamus Seeds 120

Pharmaceutical Society of Great Britain.

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

LIBRARY AND MUSEUM
SPECIAL NOTICE.

The Library and Museum will not be open in the evening during August and September.

The Library and Museum will be closed from September 1st to September 13th, both dates inclusive, for revision.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

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NORTH BRITISH BRANCH.

The Society's Rooms at 119A, George Street, Edinburgh, will be closed from and after Saturday, August 16th, and the new premises at 36, York Place, Edinburgh, will be opened on Wednesday, October 1st.

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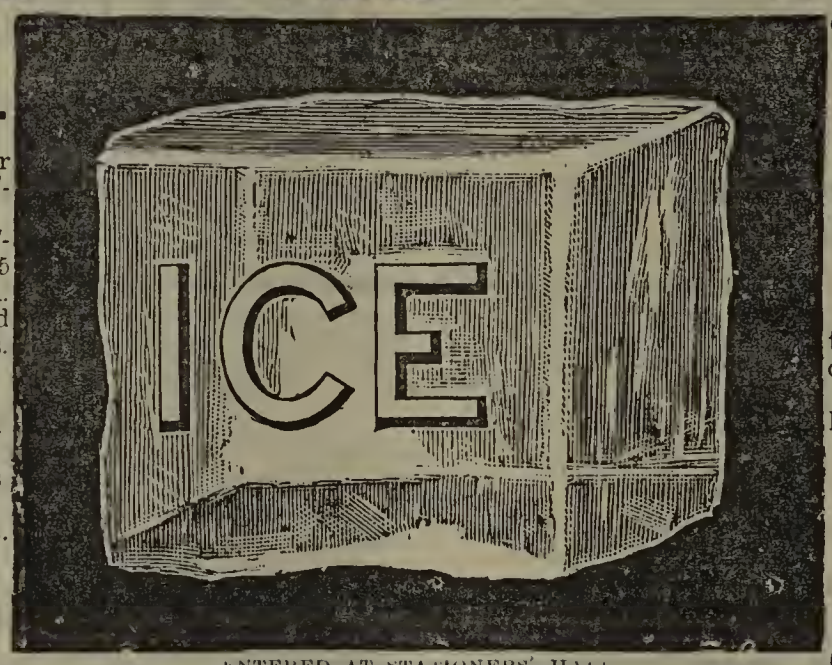

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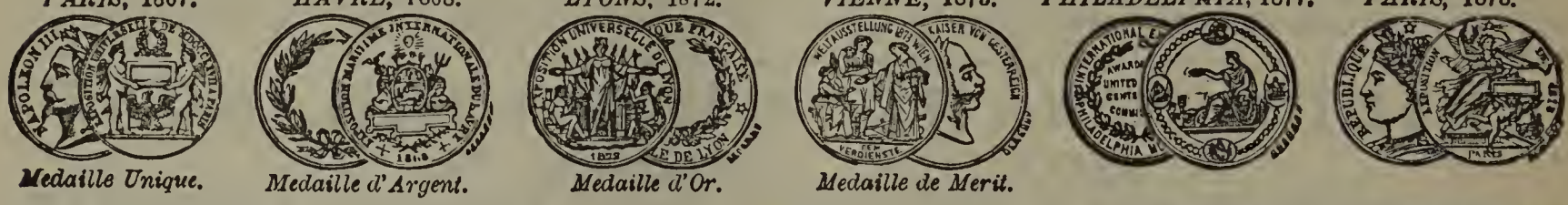

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Owes its great reputation to the happy proportions of its ingredients, which have constituted it an unapproachable and indispensable remedy for Constipation, Indigestion, Obstructions, Piles, Chronic Disorders of the Stomach, Liver and Bowels; Hæmorrhoids, Gravel, Gout, Plethora, Rush of Blood to the Head, Diseases peculiar to Females, Hypochondria, Lassitude, Impurities of the Blood and Skin, Eruptions and Blotches. It improves the appetite, keeps the head clear, the blood cool, but never debilitates. Its efficiency can be proved by the testimony of hundreds of physicians.

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Soda, Potass, Seltzer, Lemonade, Lithia, and for GOUT, Lithia and Potass.

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ESTABLISHED 1824

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A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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INTERMEDIATE TEA, 2s. per lb.
BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

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AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and Brady Street, London.
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A SPECIAL PREPARATION.

Perfectly reliable, and the most valuable fluid form for the administration of *Pepsin. Porci.* It is of definite strength and slightly acid; free from odour, and almost tasteless.

7/ per lb., C. Qts. 6/6, W. Qts. 6/.

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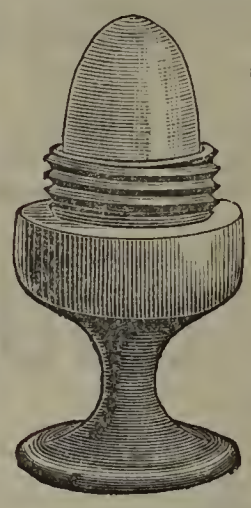
A REMEDY FOR

Headache, Neuralgia, Rheumatism, &c.



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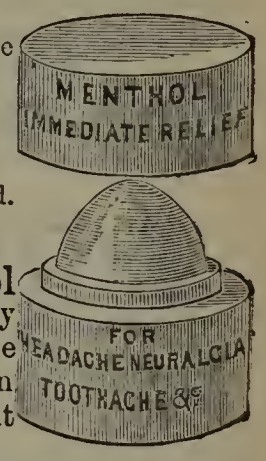

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Proprietors of MYOCOM FLY GUM, *in tins at* 1/-, 2/6 *&* 5/- *each.*

GOLD MEDAL, BOSTON EXHIBITION, 1883.

SIR JAMES MURRAY'S
PURE
FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of

ACIDITY, INDIGESTION, HEARTBURN, GRAVEL & GOUT.

Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

His **FLUID CAMPHOR** is a valuable remedy for Sleeplessness and Weak Nerves.
Bottles, 1s. and 2s. each.

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SOLE MAKERS IN GREAT BRITAIN OF

METALLIC CAPSULES,

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Coloured Side Mark, Label, and other Speciality Capsules

(For the Prevention of Fraud and Refilling of Old Labelled Bottles)

As supplied to Bass & Co., and the leading Brewers and Bottlers of Wines and Spirits throughout Europe.

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For Small Phials, **2s. 6d.** and upwards per 1000, according to size, style, design, and quantity.

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PURE ENGLISH MADE BOTTLING AND PACKAGE TINFOIL

From **1s.** per lb., and upwards. **MIXED FOIL** (Foreign Quality), from **6d.** per lb. (according to gauge).

PATENT BARREL PACKAGES AND SNUFF CANISTERS, &c.

MANUFACTORIES:

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Hydraulic and Mechanical Pressure Capsuling Machines,

ESPECIALLY ADAPTED FOR CHEMISTS' COUNTERS,

Largely in use by the Trade, and efficiency guaranteed for all sizes of Bottles, at Royalties from **5s.** to **£2 2s.** per annum.

LIEBIG COMPANY'S EXTRACT OF MEAT

The only brand warranted genuine by Baron Liebig.

CAUTION.—Numerous inferior and low-priced substitutes being in the market with misleading titles, labels and portraits of the late Baron Liebig, purchasers must insist upon having the Liebig Company's Extract of Meat.

The finest meat flavouring ingredient.
Invaluable and efficient tonic for invalids.

N.B.—Genuine ONLY with facsimile of Baron Liebig's Signature, in blue ink, across label.

SPECIAL NOTICE & CAUTION

BRAND & CO.

The original Manufacturers of Essence of Beef (green label under wrapper), and other Specialities for Invalids, have

NOT REMOVED

From their SOLE ADDRESS, No. 11, LITTLE STANHOPE STREET, MAYFAIR, W., and caution the trade to

BEWARE OF IMITATIONS.

ALLEN & HANBURYS'

EFFERVESCENT

SALINE

This is a finely granulated preparation, which in dissolving produces a sustained sparkling effervescence, and a clear, bright solution. It possesses all the advantages of an agreeable saline, combined with the anti-febrile properties of Chlorate of Potash, of which it contains a considerable percentage. It is, in short, an efficient aperient and febrifuge, and makes an exceedingly pleasant and refreshing beverage.

PRICES. This Saline is supplied IN BULK at 1s. 6d. per pound; 1s. 5d. per pound for 14 pounds; 1s. 4d. per pound for 112 pounds; or in ½-pound bottles (to retail at 1s. 6d.), 11s. per doz.

WITH OR WITHOUT LABELS.

It is supplied also on the same terms with A. & Hs.' own Labels and Wrappers ready for Retail sale.

SAMPLES FREE ON APPLICATION.

MANUFACTURED BY

ALLEN & HANBURYS

PLOUGH COURT, LOMBARD STREET, LONDON.

LIQUOR BISMUTHI. SCHACHT.

Dose, ℥j, diluted.

Great pains are taken to ensure the absolute purity of this preparation. It is not only freed from the ordinary contamination of the metal, such as copper, arsenic, silver, &c., but that which so frequently causes an offensive odour to pervade the persons of those taking the ordinary preparations of Bismuth, namely TELLURIUM, is also most carefully eliminated.

Syr. Cinchonæ Alcoholicus, Schacht.
Bark minus the woody fibre. Dose, 10 to 30 drops, diluted.

Liquor Rhamni Frangulæ, Schacht.
A real aperient, mild and constant. Dose, ℥ij to ℥iv, diluted.

Syrupus Sennæ Aromaticus, Schacht.
Made by cold maceration—does not gripe. Dose, ℥j to ℥ij.

Succus Fuci Vesiculosi, Schacht.
The preserved conceptacular juice of the plant in its most active condition. This preparation has been used with excellent results, both internally, and also as an Embrocation in Rheumatism, &c. Dose, ℥j to ℥ij.

The above Preparations are manufactured by Mr. Schacht himself in the laboratory of the firm.

GILES, SCHACHT & CO.

52, ROYAL YORK CRESCENT,

CLIFTON;

And can be procured from

BARCLAY & SONS, W. EDWARDS & SON, and all Wholesale Druggists in London and the Provinces.

CHEMISTS' CASES.

SHIPPED f.o.b. in London, or sent, *carriage paid*, to any town in the United Kingdom on receipt **£10 10s.**

THESE CASES CONTAIN—

Doz.		*at per doz.*	£	*s.*	*d.*
3	Eno's Fruit Salt, 2/9 size	21/-	3	3	0
1	Do. do. 4/6 „	35/-	1	15	0
6	Pear's Soap, 6d. Tablets (unscented)	3/4	1	0	0
3	Do. do. 1/- „ (scented) ...	6/8	1	0	0
	(*Or 6 doz. unscented 6d. at buyer's option.*)				
1	Seigel's Syrup, 2/6 size	21/-	1	1	0
1	Jeyes' Perfect Purifier, 2/-, glass bots.	12/6	0	12	6
	(*Or 3 doz. 6d. size at buyer's option.*)				
1	Do. do. 1/- glass bots.	7/-	0	7	0
2	Do. do. 6d. „	4/-	0	8	0
3	Do. do. 3d. „	1/6	0	4	6
1	Do. Sanitary Powder, 1/-, decorated tins	7/-	0	7	0
2	Do. do. 6d. do.	4/-	0	8	0
2	Do. Dog Soap, 6d. tablets ...	2/-	0	4	0
			£10	10	0

Cases containing half the above quantities, **£5 7s. 6d.**

All Orders and Remittances to be addressed to

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Sussex House, 52, Leadenhall St.

LONDON, E.C.

KILNER BROTHERS,

Glass Bottle Manufacturers,

10, Gt. Northern Goods Station

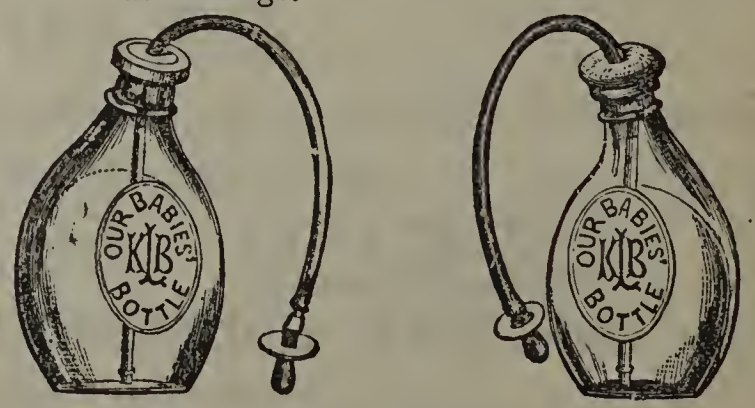
KING'S CROSS, LONDON,

Invite the attention of Chemists and others to the large variety of Glass Bottles, &c., that they supply, and solicit orders for same.

DISPENSING.—Green and White Flint, of all sizes and shapes.

PERFUMERY.—White Flint, in different styles.

FEEDING BOTTLES.—"Our Babies' Bottle," in Green and White Glass, with white, brown or black fittings.

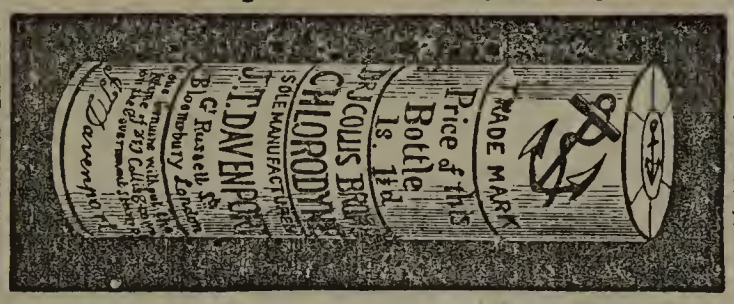


Illustrated Catalogues and detailed Price Lists of above and many other kinds forwarded on application.

THE ORIGINAL AND ONLY GENUINE.

DR. J. COLLIS BROWNE'S CHLORODYNE

ONLY GENUINE. ORIGINAL AND



IS THE GREAT SPECIFIC FOR CHOLERA, DIARRHŒA, DYSENTERY.

COUGHS, COLDS, ASTHMA, BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false.*

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

DIARRHŒA, DYSENTERY. GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient. Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

DR. J. COLLIS BROWNE'S CHLORODYNE is the TRUE PALLIATIVE in NEURALGIA, GOUT, CANCER, TOOTHACHE, RHEUMATISM.

DR. J. COLLIS BROWNE'S CHLORODYNE is a liquid medicine which assuages PAIN of EVERY KIND, affords a calm, refreshing sleep WITHOUT HEADACHE, and INVIGORATES the nervous system when exhausted.

DR. J. COLLIS BROWNE'S CHLORODYNE rapidly cuts short all attacks of EPILEPSY, SPASMS, COLIC, PALPITATION, HYSTERIA.

IMPORTANT CAUTION.—The IMMENSE SALE of this REMEDY has given rise to many UNSCRUPULOUS IMITATIONS. Be careful to observe Trade Mark. Of all Chemists. 1s. 1½d., 2s. 9d., and 4s. 6d.

SOLE MANUFACTURER,
J. T. DAVENPORT, 33 Gt. Russell St., W.C.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

Apothecaries' Hall	London.	Gale & Co.	London.	Morson, T., & Son,	London.
Allen, Hanbury & Co.	,,	Giles & Son,	Clifton.	Newbery & Sons,	,,
Baiss Brothers,	,,	Goulding, Messrs.	Cork.	Oldham, G., & Co.	Dublin.
Banks & Richards,	Birmingham.	Grattan & Co.	Belfast.	Parsons & Richardson,	Leicester.
Barron, Harveys & Co.	London.	Grimwade, Ridley,	London.	Peake, Allen & Co.	Dublin.
Bell, John & Co.	,,	Grindley & Son,	Chester.	Raimes & Co.	Liverpool.
Corbyn & Co.	,,	Hearon, M'Culloch & Co.	London.	Sang & Barker,	Edinburgh.
Cox & Gould,	,,	Hodgkinson, Tonge & Stead,	,,	Sanger, J., & Sons,	London.
Curling & Co.	,,	Hopkins & Williams,	,,	Sim, James, & Co.	Aberdeen.
Davy, M'Murdo & Co.	,,	Hovenden, R. & Sons,	,,	Smeeton, W.	Leeds.
Drew, Barron & Co.	,,	Johnson, J. H., & S.	Liverpool.	Southall & Co.	Birmingham.
Drew, B., & Alexander,	,,	Langton, W., & Co.	London.	Sutton, W., & Co.	London.
Dunn & Company,	,,	Lynch & Co.	,,	Tomlinson, Hayward & Co.	Lincoln.
Edwards, W.	,,	Mackay, John, & Co.	Edinburgh.	Treacher, Hodgkinson & Co.	London.
Evans, Lescher & Webb,	,,	Mander, Weaver,	Wolverhampton.	Westwood & Hopkins,	,,
Ferris & Co.	Bristol.	Marsden & Sons,	London.	Woolley, James,	Manchester.
Foulger, S., & Son	London.	Maw & Son,	,,	Wyleys & Brown,	Coventry.
Frazer & Green	Glasgow.	Meggeson & Co.	,,	Yates & Co.	London.

After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

Sold in Bottles—1s. 1½d., 2s. 9d., 4s. 6d., and 11s. Usual Discount to the Profession.

SOLE MANUFACTURER,

J. T. DAVENPORT, Pharmaceutist, 33, Gt. Russell St., Bloomsbury Sq., LONDON.

THE ORIGINAL AND ONLY GENUINE.

SYDNEY, NEW SOUTH WALES,

JUNE 11, 1884.

ENO'S FRUIT SALT IN EQUITY.

Before his Honor the PRIMARY JUDGE.

ENO *v.* DAVIES AND ANOTHER.

Mr. J. E. Solomon, Q.C., and Dr. Donovan, instructed by Mr. De Lissa, for the plaintiff; Mr. Owen, Q.C., and Mr. Nash, instructed by Messrs. Bull and Bull, for the defendants.

This is a suit instituted by James Crossley Eno, of Pomeroy Street, Hatcham, Surrey, England, to have the defendants, William Davies and James Channon, trading as William Davies and Co., Goulburn, and Harbour Street, Sydney, ordered to take a certificate of registration for a trade mark called "The Australian Fruit Salt" off the file at the Registrar General's office, and also to have them restrained by perpetual injunction from using the title to any other commodity. The plaintiff claimed that the trade mark was an infringement of his own, viz., Eno's Fruit Salt, Fruit Saline, and Fruit Powder. Consequential damages were also claimed. The defendant's mark was registered in this Colony two months before plaintiff's.

His Honour, in giving judgment, said he had no doubt that the case came within the principle laid down in the cases which had been cited wherein the Court enjoined a defendant not to continue the use of his trade mark. Although there were some important points of distinction in the goods, still there were points of resemblance which were calculated to induce persons to believe that they were obtaining the plaintiff's, when in reality they were buying the defendant's. The bottles were about the same weight and shape, and a purchaser of the defendant's would hardly know he had not got Eno's until he opened the package. Looking at the two bottles, he thought purchasers were exceedingly likely to be misled, because a man was not supposed to carry his last bottle with him in order to see that he was getting the same article, and persons buying were not supposed to be always suspicious that frauds were being practised upon them. He considered the term "fruit salt" sufficiently distinctive to be in itself a trade mark, and it had been proved in evidence that people generally asked for it by that name. The resemblance in the bottles and in the printing on the wrappers was so close that he regretted he could not say that it resulted from accident or was consistent with innocence. The distinctions seemed to have been carefully studied in order to escape, if possible, the results of imitation. The defendants had brought out their article just when the plaintiff's had taken a gigantic jump in public estimation, and had acted in such a way as to induce him to believe that they intended to lead the public to think they were buying plaintiff's goods when they were served with theirs. There was fraud which tradespeople unfortunately did not think much of, but which the Court always regarded with the greatest reprehension. He did not think the argument as to the second section of the Act had very much to do with the case. When the defendant registered he must have obviously known that Eno's Fruit Salt was in the market. He had no more right to register than he had to sell. He did not think the Act in any way interfered with the powers which the Court of Equity possessed before it became law. The Act had only been passed to afford a speedier and readier remedy to those who registered under it. The seventh section evidently contemplated that such a suit as the present one should be taken by a person who considered he had been wronged, as the plaintiff had been. He would grant the injunction in the terms of the prayer, restraining the defendants from using the trade mark, on the ground that it was an infringement on the plaintiff's prior and exclusive claim. He would order them to take such proper and necessary steps as were possible to take the certificate of registration off the file, but if a power greater than theirs stood in the way in the matter, they would be relieved from attachment. He did not see how he could compel the Registrar-General, who was an officer appointed by Parliament, to do a certain thing, to cancel the certificate, especially as he had not been made a party to the suit. The certificate, however, could be delivered up, because it was part of the subject matter of the suit. He would order the defendants to pay costs up to the hearing, and would direct an issue as to consequential damages to be tried before a special jury of four in the Jury Court on a day to be named. He would make the question of costs of these further proceedings dependent upon the result, because it might be that he would not give plaintiff his costs if he did not recover a substantial amount.

CAUTION.—Legal rights are protected in every civilized country.

Sold by all Chemists. Directions in Sixteen Languages how to Prevent Disease.

Prepared only at Eno's Fruit Salt Works, Hatcham, London, S.E., by J. C. Eno's Patent.

BARTUNG.

BY W. T. THISELTON DYER, M.A., C.M.G., F.R.S.

In Dymock's 'Vegetable Materia Medica of Western India' (p. 538) there is the following account of this undetermined drug:—

"*Plantago* sp.? Local name, Bartung.—These are minute, oblong, brown seeds, marked with waved, slightly elevated, longitudinal ridges of a darker colour; one side is arched, the other concave, and marked with a scar showing the attachment to the ovary. They are insipid and have an oily smell when crushed. Soaked in water they become coated with a transparent mucilage. Bartung, usually pronounced Bàrhang, is a remedy in great repute in Persia for dysentery. A large quantity is imported into India through Bombay. We have the evidence of Valentine Baker as to its efficacy when he was suffering from the above-mentioned disorder during his travels in Khorasan. When dysentery is supposed by the hakims to be due to a heated condition of the humours, Ispaghul is preferred. When a cold condition is diagnosed, Bartung is given. It is one of the several kinds of Lésán-ul-Hamal described in Arabic works, and is generally attributed to *P. psyllium*."

Early in the year Colonel Beddome, F.L.S., brought to Kew a small sample of the drug which he had received from Persia, where great virtues were attributed to it. At his request we sowed the seed of which it consisted for the purpose of identifying the plant. It turns out to be nothing more or less than *Plantago major*. I have since ascertained that Dr. Forbes Watson in his 'Index to Native and Scientific Names' gives the following identifications of Bartung with various species of *Plantago*:—*P. lanceolata* (Irvine), *P. major* (Honigberger), *P. psyllium* (Birdwood). It might at any rate be worth trying the value of seeds of *Plantago major* in this country in dysenteric affections.

THE ESTIMATION OF ETHYL NITRITE IN SPIRIT OF NITROUS ETHER.*

BY T. S. DYMOND.

There are few pharmacopœial preparations the tests for which are so eminently unsatisfactory as those for spirit of nitrous ether. The following are some of the many tests that have been employed:—

I. The chloride of calcium test.—If the spirit be shaken with twice its volume of saturated solution of chloride of calcium, 2 per cent. will separate as an ethereal liquid. This test gives no definite indication of the amount of ethyl nitrite.

II. A test described by Mr. Dott, *Pharm. Journ.*, [3] xiv., 819.—To the spirit, solution of potassium iodide and a little starch paste are added, and the mixture titrated with volumetric solution of hyposulphite of sodium till colourless. This test gives fallacious results, for it appears that the nitric oxide which is liberated becomes oxidized to nitrous acid again, which liberates more iodine from the solution. A spirit known to contain 2 per cent. of ethyl nitrite was estimated by this method. It was not till an amount of hyposulphite solution equivalent to 16 per cent. of ethyl nitrite had been added that the blue colour of the solution was permanently got rid of.

III. A test described by Mr. Symons, *Pharm. Journ.*, [3], xiv., p. 819.—The spirit to be tested is mixed with an acid solution of ferrous sulphate, and the depth of colour of the mixture compared with a similar one containing a spirit in which there is a known amount of ethyl nitrite. As, however, spirits containing the same amounts of ethyl nitrite produce different shades of colour, and as the colour quickly fades, this test is not reliable.

IV. Hoffmann's test, modified by Dupré, *Pharm. Journ.*, [3], x., p. 93.—The spirit is here saponified with potash, the alcohol evaporated off, the residue re-acidified and titrated with standard solution of permanganate of potassium till its colour no longer disappears. This method has been shown by Mr. Dott to give variable results.

V. A test proposed by Professor Eykman.—It depends on the production of a scarlet colour with a mixture of phenol and sulphuric acid. This reaction is also given by aldehydes, as demonstrated by Mr. W. R. Dunstan in a paper read at a meeting of the School of Pharmacy Students' Association (*Pharm. Journ.*, [3], xiv., 837).

VI. Rosenbladt's test (*Zeitsch. Anal. Chem.*, xvii., Heft. 3).—The spirit is saponified with alcoholic potash, the alcohol driven off by evaporation, and the residue heated with concentrated solution of ammonium chloride in an atmosphere of carbonic acid. The amount of nitrogen evolved is measured and from that the percentage of ethyl nitrite is calculated. This test, Professor Eykman has shown, gives results far too low, as the nitrogen evolved is only about half the theoretical amount.

VIII. Eykman's test, *New Remedies*, May, 1882.—This is the only test at present suggested which has not been condemned as unreliable for estimating the nitrous constituent. It consists in the measurement of the volume of nitric oxide given off when the spirit is heated with an acid solution of ferrous sulphate—

$$2FeSO_4 + H_2SO_4 + 2EtNO_2 = Fe_23SO_4 + 2EtHO + 2NO.$$

The following are notes upon several experiments which were made in order to determine the value of this test.

The apparatus used was the same as that figured in the *Pharmaceutical Journal*, [3], vol. xiii., p. 64, with the exception of the flask with the retort-like neck, for which I substituted bent tubes fitted into an india rubber cork kept wet with water.

The solutions used were an acid solution of ferrous sulphate, about 1 in 5 or 10, and a soda solution of specific gravity 1·1 to 1·15, which had been freed from oxygen by the addition of a little ferrous sulphate solution.

The following precautions were found necessary in order to obtain reliable results:—If a spirit contain more than a normal amount of nitrous ether, proportionally more ferrous sulphate solution must be employed, as otherwise an excess of gas will be formed and lost. This was the cause of error in experiment D.

The contents of the flask must not be boiled too long, for if the soda solution becomes much heated dissolved gases are given off, and make the results too high, and if it rises to the boiling-point, the steam ceases to be condensed, suddenly fills the tube, and, together with nitrous oxide, escapes at the bottom.

In reading off the amount of gas, the soda solution remaining in the tube must be replaced by

* Read at a meeting of the School of Pharmacy Students' Association, June 26, 1884.

water, and the sides of the tube rinsed with water in order to remove any adherent soda solution, which being of a higher specific gravity would decrease the pressure on the gas; then immerse the tube under water till the temperature is normal, and read off the volume of the gas. Professor Eykman directs that the reading should not be taken for an hour, but as the nitric oxide is constantly being oxidized by the oxygen dissolved in the water to the readily soluble higher oxides, the readings would be too low if this were done.

If an india rubber cork be used for the flask, it must be kept moist, as when the flask is vacuous air readily enters through the pores unless it be wet with water. This was the cause of error in experiment A.

Loss of gas by evaporation from the mixture before it be drawn into the flask must be avoided. Sufficient ferrous sulphate solution and a tube not too large will partially prevent this. What loss is unavoidable will be counterbalanced by the gases previously dissolved in the ferrous sulphate solution, which are given off when exposed to the partial vacuum in the flask. These gases amount to 1 c.c. in the quantity usually used.

The percentage of nitrous ether is obtained by the following formula:—

$$\frac{\text{Observed volume}}{\text{Sp. gr.} \times \text{amount of Spt. taken}} \times \frac{15}{11160} \times \frac{75}{30} \times \frac{100}{1}$$

$$\text{or } \frac{V}{S \times A} \times \cdot 336 = \text{per cent. of } EtNO_2,$$

with corrections for temperature and pressure if great exactness is required.

The following are results which were obtained:—

Spirit	A.	.	Exp.	1	.	68	c.c. = 5·4	per cent. $EtNO_2$
„	„	.	„	2	.	14*	„ = 1·1	„ „
„	B.	.	„	1	.	28·5	„ = 2·3	„ „
„	„	.	„	2	.	28·5	„ = 2 3	„ „
„	C.	.	„	1	.	13·5	„ = 1·1	„ „
„	„	.	„	2	.	13·25	„ = 1·1	„ „
„	D.	.	„	1	.	75	„ = 6·0	„ „
„	„	.	„	2	.	82*	„ = 6·6	„ „
„	E.	.	„	1	.	63·5	„ = 5·1	„ „
„	„	.	„	2	.	63·5	„ = 5·1	„ „
„	F.	.	„	1	.	1·5	„ = ·1	„ „
„	„	.	„	2	.	1·5	„ = ·1	„ „

A glance at the foregoing table will show that with the exception of the figures marked with an asterisk, the discrepancies of which have already been explained, Eykman's process gives concordant results in each pair of experiments, no matter whether the solutions be weaker or stronger than the official or the commercial varieties of spirit of nitrous ether. The method would seem, therefore, to be trustworthy.

It has been pointed out that this process estimates the free nitrous acid as well as nitrite of ethyl.

Mr. MacEwan estimates the free nitrous acid separately which may then be subtracted from the total nitrites. He adds a drop of methyl orange to the spirit and then titrates with soda solution till the pink colour has disappeared, but the results obtained are not reliable, for spirit of nitrous ether itself was found to prevent the formation of the pink colour, and acetic acid has been shown by Mr. Proctor (*Pharm. Journ.*, [3], xiii., 73) to produce it as well as free nitrous acid. But it would not seem necessary to estimate the free nitrous acid separately, for, together with the alcohol in the spirit, it will probably have the same therapeutical effect as nitrite of ethyl itself. The freedom from much colour, and the gentle effervescence with bicarbonate of potassium will give a fair indication of the absence of great excess of free acid.

Professor Eykman's test has been objected to because it is too delicate an operation for ordinary use, but with the above precautions, and after a few trials, I believe it will be found to be as simple as, and far more reliable than any other test which has been proposed.

The foregoing experiments were commenced at the suggestion of Professor Attfield, and were carried out in the laboratories of the Pharmaceutical Society.

THE GALENICAL PHARMACY OF THE NEW PHARMACOPÉE FRANÇAISE.

(*Continued from page* 64.)

Acting on the supposition that wherever a process of manufacture has been supplied, it is understood that it becomes the duty of the pharmacien to attempt its preparation, one is struck by the directions given respecting *Fats and Oils*.

Beurre de Cacao and Beurre de Muscade (Nutmeg) have both their process, as well as Oil of Almonds, Croton and Castor oils. Cod Liver oil is taken out of the list of official processes, though as before it is pharmaceutically described in the list of Materia Medica. The brown oil is to be rejected, as well as the too pale variety which has been chemically treated. Oil with a slight amber tint is to be preferred. The colour test by concentrated sulphuric acid is retained, the oil passing through the gradations of deep violet, cherry-red, and yellowish-black.

Axonge (Graisse de Porc, Saindoux).—Adeps præparatus is prepared by cleansing and bruising the flare, and melting by gentle heat over the water-bath. When in a semi-liquid state stir till cold.

Huiles Médicinales (Medicated Oils) are solutions of various substances in Olive oil; the Huiles de Cigue, Belladone, Morelle (Nightshade), and others are thus made, 1 : 2 (oil).

The next formula is practically a new preparation.

Huile Phosphorée,
Oleum phosphoratum.

Phosphorus (white)	1
Oil of Almonds (bleached)	95
Ether	4
	100

Take a flask which shall be nearly filled on adding the phosphorus and oil; heat in the water-bath up to about 80° C. (176° F.). During the operation remove the stopper occasionally; then close and shake till perfect solution is effected. When cold add the ether. Decolorize the oil by heating for a few minutes at a high temperature.

Clearly this phosphorized oil, though reduced by half from the formula of 1866, is too strong for internal use, for this purpose it is diluted as follows:—

Oleum phosphoratum (centesimal)	10
Oleum Amygdalarum	90
	100

Huile Camphrée (Camphorated Oil) is made in the proportion of 1 : 9. Into the question of Volatile oils or Essences we need not enter, as their preparation is beyond the ambition of the retail British pharmacist. The types given are Huile Volatile d'Amande Amère (Essential oil of Bitter Almonds);

Huile Volatile de Cannelle (Oil of Cinnamon); and the Huile Volatile de Fleur d'Oranger (Neroli). Laudanum de Rousseau and Laudanum de Sydenham, names consecrated by long use, are separated by a stern alphabet from the Teintures Alcooliques. Rousseau's Laudanum remains unchanged save by the substitution of Distilled water for Eau chaude; while Vin de Grenache replaces Vin de Malaga in the Sydenham preparation.

Lavements or Enemas require no notice.

Limonades. Most favourite remedies, next if not equal to the syrups. Limonade sulfurique now stands correctly printed in the second edition.

Dilute Sulphuric acid (au 10°) . .	20 grams.
Distilled water	875 grams.
Simple Syrup	125 grams.

By a natural mistake 2 grams were originally ordered, because, in the former Codex, pure Sulphuric acid was employed.

One formula will be interesting to quote.

Limonade Purgative au Citrate de Magnésie.

Citric acid	30 grams.
Carbonate of Magnesia	18 grams.
Distilled water	300 grams.
Simple Syrup	100 grams.
Tincture of Lemon peel	1 gram.

British pharmacists will kindly notice that Citrate of Magnesia is not a creature of the imagination.

The powder for making the lemonade is as follows.

Poudre pour Limonade Sèche au Citrate de Magnésie.

Calcined Magnesia	6·50 grams.
Carbonate of Magnesia	6 grams.
Citric acid	30 grams.
Sugar	60 grams.
Tincture of Lemon peel	1 gram.

The above quantity represents 50 grams of Citrate of Magnesia.

Liniments.—Linimenta have been reduced in number and the strength altered occasionally. Notably the Liniment Excitant, which was a hospital formula, Linimentum Terebinthinæ, and the Linimentum Saponis c. Opio, have been dropped.

Many liniments may be camphorated, directions for so doing but no separate formula being given.

Opodeldoch of the Codex must not be confused with Liniment Savonneux, Linimentum cum Sapone, the form for which is—

Tinctura Saponis	50 grams.
Ol. Amygd. dulc.	5 grams.
Alcohol at 80°	45 grams.
	100

Use Camphorated alcohol to obtain Liniment Savonneux camphré.

Tinctura Saponis.

Almond soap 1. Alcohol (60°) 5.

Three well known liniments will be found useful.

Linimentum Ammoniæ.

Ol. Amygd. dulc. 9. Liq. Ammoniæ 1.

Linimentum Calcis. (altered).

Ol. Amygd. dulc. Liq. Calcis *Saturated* of each equal parts.

The change from the old formula of 1 : 9 is not great, for the whole of the emulsion is now retained; formerly the uncombined portion was rejected.

Linimentum Chloroformi.

Ol. Amygd. dulc., 9. Chloroform, 1.

Lotions, three in number, show one deviation from the strict rule adopted by the Commission. Common water is ordered both in the Lotion of Acetate of Lead (1 in 50) and in Goulard. A fine milky appearance is produced. Eau Blanche, which has been usually considered as Goulard, is now Lead acetate and water *without* Alcoholat Vulnéraire, and this must be noticed in dispensing a French ordonnance.

The preface calls attention to the *Mastic Dentaires* as new preparations. They are as follows:—

Mastic Dentaire.

Mastic in tears 20 grams. Ether (0·758) 10 grams.
Dissolve and filter through cotton wool.
Chloroform may be used instead of ether.

Mastic Dentaire au Benzoin.

Gum Benzoin 20. Ether (0·758) 10.

A much amended formula is given for Oxymel Scillæ which would apply to Oxymel Colchici though the latter has ceased to be official. The preparation is now called—

Mellite de Vinaigre Scillitique.

Acetum Scillæ	500 grams.
Honey	2000 grams or 1 : 4.

The first edition by a misprint gave 50 grams as the proportion.

The original Mellite de Scillæ, made without vinegar, was a poor preparation and difficult to keep.

Mucilages.—De Semence de Coing (Quince) 1 : 10 (vice 1 : 5). Gum Arabic—equal parts of Acacia and water. Gum Tragacanth, 1 : 9.

A method is given for the preparation of a dry concentrated mucilage of Quince, Linseed and Psyllium; when required to be used in the proportion of 1 : 100.

Oléosaccharures.—Oleosacchara are common to continental pharmacy; those made with essential oil and sugar are 1 : 20, the fragrant peel of lemon, bergamotte and orange are also used.

Onguents.—Unguenta are not of international interest.

The word *Opiat* must not be taken as indicating an Opium preparation, but an electuary or paste. Opiat de Copahu composé is an Electuary; Opiat Dentifrice is a Tooth Paste; in neither formula does opium form an ingredient.

Pâtes are specially French remedies, and it would appear that the pharmacien is bound to manufacture his own Pâte de Gomme (dite de Guimauve) and his own Pâte de Jujubes. The former does not contain one particle of Marshmallow, a fact not unknown to our own manufacturers of that article.

Pilules.—Pilulæ have been somewhat reduced. those of Morphiæ hydrochloras, Nitre Camphrées, de Savon, Savonneuses Nitrées, and Sulphate of Quinine having been omitted. Cape Aloes is now intended, unless there are directions to the contrary, and is accordingly used in Pilules d' Aloès Simples; d'Aloès et de Gomme-Gutte (Gamboge); d'Aloès et de Savon (Aloes c. Sapone); Pilules Ante Cibum; and the Pilules de Bontius (Aloes, Gamboge, Ammoniacum and White Vinegar).

Socotrine Aloes, once much esteemed, has ceased to be a commercial article.

The formulæ have been constructed frequently to make 10 pills, a far more convenient arrangement than the old 100 or 200 which was especially inconvenient in Pil. Colocynthidis Comp., the formula being now arranged for 10 pills only.

Moreover, the small treatise on pills generally has disappeared.

We may note an alteration made in the second

edition respecting Pilules de Brômure ferreux: the formula now reads—

Solution officinale de Brômure ferreux, 15 grams, a mistake that might arise from not consulting the chemical section is thus prevented.

Attention being officially directed to two preparations as new, the formulæ are here reproduced.

Pilules de Brômure Ferreux.

Pilulæ Ferri Bromidi.

Solution of Ferrous Bromide	15 grams.
Iron filings (powdered) . .	10 centigrammes.
Pulv. Gum. Acaciæ,	
Pulv. Glycyrrh.	āā q.s.

Evaporate to $\frac{2}{3}$; add the powders so as to make a pill mass. Divide in 100 pills each containing 5 centigrammes Ferrous Bromide. Coat with ethereal solution of Mastich or Tolu.

Pilules de Chlorure Ferreux.

Ferrous Chloride (dry) . . .	1 gram.
Pulv. Gum. Acaciæ,	
,, Glycyrrh.	āā 50 centigrammes.
Water	q.s.

The above to make 10 pills. Varnish as usual.

Pilules de Carbonate Ferreux.

(Vallet).

Ferrous Sulphate (crystals)	10.
Sodium Carbonate (crystals)	12.
Honey	3.
Sugar of Milk	3.
Sugar	q.s.

Dissolve separately by heat the iron and soda in boiling water containing $\frac{1}{20}$ of sugar. Mix: allow to settle: pour off supernatant liquid, washing till tasteless with boiling water, sugared. Place the salt in a cloth impregnated with syrup: express and add the sugar of milk, and concentrate to the consistence of an extract. Of this take 3 parts and 1 of Pulv. Glycyrrh., and divide in pills containing 25 centigrammes each. Silver.

It will be observed that sugar is always in contact with the iron to prevent decomposition. Honey is an excipient very constantly used and is seen to advantage in Iodine pills; powdered liquorice root or marshmallow giving the required firmness. Oil of turpentine is made into a pilular consistence with Carbonate of Magnesia, a very poor method as the practical dispenser knows.

Granules, as the name indicates, are very small pills containing active remedies; such are Arsenious acid, atropine, digitaline, strychnine, and the like.

Pommades are soft ointments made with lard, simple or benzoinated, fats or a hydrocarbon as vaseline.

They are 40 in number; often with popular names, and are not officially represented in English pharmacy.

Pommade Camphrée.

Pulv. Camphoræ 3. Cera Alba 1. Adeps 9.

Pommade Citrine corresponds to Ung. Hydrargyri nitratis, the nitric acid and mercury being in the proportion of 2 : 1.

The Pommades of the Red and Yellow oxides of Mercury are made with vaseline. Pommade Soufrée. Sulphur 1, Ol. Amygd. 1, Adeps. Benz. 8.

Potions = Misturæ and are for the most part extemporaneous preparations: their number has been reduced, and the late Dr. Todd, of King's College, London, has his name perpetuated in the

Potion de Todd.

Old Brandy	40 grams.
Simple Syrup	30 ,,
Tincture of Cinnamon	5 ,,
Distilled Water	75 ,,

An observation is appended that rhum is sometimes substituted for cognac, so that the old pleasantry of the toddy system still survives.

(*To be continued.*)

THE ALKALOIDS OF ACONITUM LYCOCTONUM.*

History.—In 1865 Hübschmann announced that he had discovered in the root and rhizome of the yellow aconite, *Aconitum lycoctonum*, two new alkaloids, which he named lycoctonine and acolyctine; they differed from one another notably in their solubility in ether and water, lycoctonine being soluble in ether but only sparingly in water, whilst acolyctine was insoluble in ether but dissolved by water. Hübschmann, however, subsequently stated that acolyctine was probably identical with the napelline he had obtained from *Aconitum Napellus*. Lycoctonine has been examined chemically by Flückiger and by Dragendorff, whilst physiological experiments by Klebs showed that it was much less powerful in its action than aconitine. Schroff, jun., found that different samples of napelline (acolyctine) of commerce varied both in their chemical reactions and in the degree of physiological effect they were capable of producing; lycoctonine was less active. He also pointed out the fact that the presence of these two alkaloids was an insufficient explanation of the powerful toxic action which the root of *Aconitum lycoctonum* possessed, and thus threw a doubt on their being at least the only active principles there present.

In all these physiological experiments, as well as others by Schroff, sen., Buchheim, Eisenmenger and Ott, the identity of napelline with acolyctine has been assumed: no trial has yet been made with acolyctine prepared from *A. lycoctonum*.

Wright and Luff have shown that the aconitine and nepaline of commerce were formerly very impure, being contaminated with their decomposition products as well as with other aconite alkaloids. They found that aconitine when heated with water in sealed tubes decomposed into benzoic acid and aconine, whilst nepaline was transformed into dimethylprotocatechuic acid and pseudaconine. Under the influence of acids aconitine yielded apoaconitine and nepaline apopseudaconitine. Wright and Luff were of opinion that Hübschmann's acolyctine and napelline were probably aconine more or less pure, that lycoctonine consisted of a mixture of pseudaconine with more or less undecomposed nepaline and that *A. lycoctonum* contained both aconitine and nepaline. The properties of aconine and pseudaconine, as ascertained by Wright and Luff, indicate, it is true, a close relationship if not identity between the former and acolyctine, and between the latter and lycoctonine; and their supposition also offers an explanation of the powerful toxic action of the root of *A. lycoctonum*. But it is also quite possible that the plant might produce small quantities of aconitine and nepaline together with comparatively large amounts of aconine and pseudaconine, and therefore contain naturally those two alkaloids which have as yet been produced by artificial means only. Or further, it is not unreasonable to anticipate in the yellow aconite alkaloids differing from both aconitine and nepaline as well as from acolyctine and lycoctonine, but giving rise to the latter two by their decomposition. To throw more light on these matters was the object of the authors' investigation.

The material necessary for the research was collected in Switzerland, in July, 1883.

Isolation of the Alkaloids.—The method adopted by the authors was Duquesnel's modified as follows:—

Two kilos of the powdered root were mixed with tartaric acid (successive portions of 10 and 5 grams) and exhausted with strong spirit; for this, three macerations sufficed. The tincture was concentrated, mixed with

* Abstract of a paper by G. Dragendorff and H. Spohn, published in the *Russische Pharmaceutische Zeitschrift*, xxiii.; 313 to 384.

water, filtered and repeatedly agitated with ether whilst still acid. The ether removed traces of an acid resembling protocatechuic, but benzoic acid could not be detected. None of the acid decomposition products of the alkaloids presently to be described could be found, a proof that a suitable method of extraction had been adopted.

The liquid after exhaustion by ether was made alkaline with bicarbonate of soda and again agitated with ether, which now removed a quantity of alkaloid. After exhaustion with ether, chloroform extracted a further portion of alkaloid from the alkaline liquid, in which after this treatment only traces of alkaloid could be detected.

The ethereal solutions were evaporated to dryness and the alkaloid, in which Hübschmann's lycoctonine was anticipated, was purified by powdering, digesting with ether, evaporating the ethereal solution and repeating the treatment until the alkaloid dissolved easily and completely in the ether. It was finally obtained in the form of a pale yellow resinous mass, yielding a white powder and dissolving completely in dilute acids. No attempt to crystallize it was successful.

The alkaloid dissolved by the chloroform was purified by similar treatment with ether, which solvent removed a notable quantity of the first alkaloid. After purification by solution and treatment with animal charcoal the second alkaloid was obtained in the form of a white or pale reddish powder.

Fifteen kilos of the (dry) root yielded 170 grams (1·13 per cent.) of alkaloid soluble in ether, and 120 grams (0·8 per cent.) of alkaloid soluble in chloroform.

Alkaloid Soluble in Ether.—In this lycoctonine was anticipated, but it was found on examination to differ materially from that alkaloid, especially in being non-crystallizable. As it could not be identified with any known alkaloid the name of lycaconitine was proposed for it.

Ultimate analysis showed the probable formula to be $C_{27}H_{34}N_2O_6 + 2\ H_2O$, the two molecules of water being given off at a temperature of 110° C., at which, however, the alkaloid itself undergoes change. The accuracy of the formula was confirmed by the examination of the salts as well as of the platinum and gold compounds. The latter, and, indeed, the double salts generally are unstable, suffering partial decomposition when washed with water.

None of the salts could be crystallized, but as they are easily diffusible they are probably crystallizable. The nitrate can be obtained and purified by dissolving the alkaloid in ether, and cautiously adding nitric acid mixed with ether. The nitrate of lycaconitine is precipitated, the first fraction carrying down all the colouring matter that the solution may contain. All the fractions possess the same qualitative and quantitative action on animals. Their composition was $C_{27}H_{34}N_2O_6HNO_3$. Compounds with the halogens (Cl and Br) contained less of the halogen than calculated. Bromine water precipitates amorphous yellow tribromlycaconitine. Petroleum spirit dissolves traces only; benzine, absolute alcohol, bisulphide of carbon and chloroform are miscible with it in almost all proportions. Ether takes up about 8·7 per cent., water about 0·76 per cent., but by long contact with the latter the alkaloid appears to undergo change.

A 10 per cent. solution of lycaconitine in absolute alcohol is dextro-rotatory $(\alpha)_D = +31·5°$; for a 10 per cent. solution of the nitrate in water $(\alpha)_D = +19·40°$. After drying *in vacuo* lycaconitine begins to melt at 111·7°, and is completely fused at 114·8° (corr.); the alkaloid undergoes, as previously observed, partial decomposition.

The reactions of lycaconitine show but little that is characteristic. With sulphuric acid it gives a reddish-brown solution; sulphoselenic acid* is coloured rose or pale reddish violet; this reaction is not exhibited by aconitine, nepaline or commercial lycoctonine. Syrupy phosphoric acid yields with lycaconitine a violet solution when warmed. Lycaconitine is incompletely precipitated by caustic potash ammonia and alkaline carbonates; strong alkalies partially decompose it.

The foregoing details suffice to show that lycaconitine is not identical with Hübschmann's lycoctonine or acolyctine, nor with aconitine or nepaline, or indeed with any other known alkaloid. The name lycaconitine which has been bestowed on it is justified by the resemblance which it shows in some of its reactions to aconitine and nepaline.

Decomposition of Lycaconitine. — When heated with water in sealed tubes lycaconitine decomposes, yielding—

1. An acid soluble in ether.
2. An alkaloid soluble in ether.
3. An alkaloid soluble in chloroform.
4. Resin soluble in chloroform.

The decomposition is thus seen to be very complex. The chief bodies of interest which the authors have further investigated are lycoctonic acid, a constituent of the acid soluble in ether, and lycaconine, the alkaloid soluble in ether.

Lycaconine is not identical with lycaconitine, lycoctonine or acolyctine. It is richer in nitrogen than lycaconitine, and crystallizes from ether and alcohol. Its solution exhibits a fine blue fluorescence, is coloured purple by chlorine water, and is precipitated by alkaloidal group reagents,

The alkaloid isolated by shaking with chloroform is probably identical with Hübschmann's acolyctine.

When lycaconitine is warmed with a 4 per cent. solution of caustic soda the amorphous alkaloid disappears and a crystalline one separates from the liquid—the decomposition takes place more smoothly in open vessels than in sealed tubes, a few minutes at a temperature of 35° C. sufficing to complete the reaction.

In addition to the crystalline alkaloid a second soluble in chloroform is retained by the mother liquid, together with lycoctonic acid, and a fourth substance which could not be isolated.

The first of these alkaloids, that which separated in crystals, agreed in its more important properties with Hübschmann's lycoctonine. The formula was ascertained to be $(C_{27}H_{47}N_2O_7)_2,\ 3H_2O$. One part was soluble in 4 of absolute alcohol, 3 of chloroform, 58·4 of ether, 64·5 of benzene, and 247 of water. It has an alkaline reaction and is dextrorotatory $(\alpha)_D = +46·4°$.

The second alkaloid, extracted by shaking with chloroform, showed a close resemblance to Hübschmann's acolyctine.

Lycoctonic acid is crystallizable, sparingly soluble in cold water, tolerably freely in ether, still more so in absolute alcohol or chloroform.

Heated with dilute acid lycaconitine undergoes a decomposition similar to that effected by water alone.

Alkaloid Sparingly Soluble in Ether.—This alkaloid, extracted by the authors with chloroform, after separation of the lycaconitine by ether, differs so strikingly from Hübschmann's acolyctine that the possibility of identity appears excluded. It was named myoctonine in reference to a species of aconite, myoctonon, mentioned by Pliny. It is amorphous and the salts it formed could not be crystallized. Analysis showed the formula of the alkaloid after drying over sulphuric acid to be $C_{27}H_{30}N_2O_8$, and the correctness of this formula was confirmed by an examination of the salts. Bisulphide of carbon, absolute alcohol, benzene and chloroform dissolve the alkaloid in almost any proportion. The taste is bitter, not pungent. It is dextrorotatory, melts at 143° to 144°, and gives a precipitate with alkaloid group-reagents, but yields no characteristic colour reactions.

Warmed with 4 per cent. solution of caustic soda myoctonine decomposes like lycaconitine into lycoctonine

* Eight c.c. water, 6 c.c. pure sulphuric acid and 0·3 gram selenate of soda.

lycoctonic acid, an alkaloid resembling acolyctine and a fourth body, the nature of which could not be ascertained. Since lycaconitine and myoctonine are so closely allied both chemically and physiologically, this failure in each case to isolate the fourth decomposition product must be regretted, as in it there would probably be found the key to the differences between the two alkaloids.

From the foregoing it is evident that the long continued heating with carbonate of soda to which Hübschmann subjected the alkaloids originally present in the root converted them into lycoctonine and acolyctine. The action of caustic soda upon lycaconitine is probably first to split it up into lycoctonine and lycoctonic acid; one or other of these then probably yields acolyctine by further decomposition.

Wright and Luff have supposed their pseudaconine to be identical with Hübschmann's lycoctonine. Apart from other differences the authors of this paper find their lycoctonine to contain a much larger percentage of nitrogen; acolyctine differs from aconine in its behaviour to bromine.

Physiological experiments are now being carried on with the two alkaloids, lycaconitine* and myoctonine.

SYRUP OF HYPOPHOSPHITES WITH IRON.†

BY CHARLES D. RANDALL.

In addition to the perfect stability, one of the chief qualities which characterizes the ferric from the ferrous salts, is the more agreeable taste of the former, especially when existing in combination with an organic acid. Syrup of hypophosphites, which was admitted to the list of preparations in the last revision of the United States Pharmacopœia, when made by the process there ordered contains to the fluid drachm about 3 grains of calcium hypophosphite and 1 grain each of the corresponding salts of sodium and potassium. The tendency of many of the soluble iron salts to precipitate when in the presence of the hypophosphites has caused much trouble in the selection of a suitable salt without this property. Finally, after the subject was much discussed, ferrous lactate was selected as being the least objectionable, and is ordered in the preparation of the syrup with iron, in the proportion of 96 grains to the pint.

According to the U.S. Pharmacopœia ferric hypophosphite is soluble in a solution of sodium citrate, forming a green liquid. It is found by direct experiment that one equivalent of the hypophosphite requires one of the citrate for complete solution. This solution on concentration, is shown to contain a mixture of crystals of sodium hypophosphite and an amorphous compound. The same mixture may be obtained by the inverse process—the union in solution of one equivalent of ferric citrate and three equivalents of sodium hypophosphite. If, however, one equivalent of ferric citrate be treated in solution with one equivalent of sodium hypophosphite an apple-green solution results, containing an amorphous compound which may be represented thus:—

$$\begin{matrix} Fe-Py \\ \| \\ Ci-Na. \end{matrix} \qquad (1)$$

Py being the symbol for the radical of hypophosphorous acid and Ci the symbol for the radical of citric acid.

By careful evaporation the liquid may be reduced to a syrupy consistence, and after pouring on a glass or porcelain tile the product may be obtained in thin soluble scales having an acidulous taste. But if one equivalent of ferric citrate be treated in solution with two equivalents of sodium hypophosphite, a somewhat lighter green solution than the foregoing results containing a very soluble amorphous compound, which, though deliquescent, may be obtained in scales, and is represented thus:—

$$\begin{matrix} Fe=Py_2 \\ | \\ Ci=Na_2 \end{matrix} \qquad (2)$$

It is also found by experiment that ferric hypophosphite is soluble in potassium citrate, each equivalent of the hypophosphite requiring an equivalent of the citrate for solution. This solution is shown on evaporating to contain a mixture of crystals of potassium hypophosphite and a green coloured crystalline compound. This mixture may be obtained by the inverse process, treating a solution of one equivalent of ferric citrate with three equivalents of potassium hypophosphite. But if one equivalent of ferric citrate be dissolved in a solution of one equivalent of potassium hypophosphite the solution becomes olive-green in colour, and contains a non-deliquescent, but very soluble scale compound which is represented thus:—

$$\begin{matrix} Fe-Py \\ \| \\ Ci-K. \end{matrix} \qquad (3)$$

If one equivalent of ferric citrate be treated in solution with two equivalents of potassium hypophosphite, an olive-green crystalline compound is formed, which, though quite soluble, is not as freely so as the last. This crystalline compound may be represented thus:—

$$\begin{matrix} Fe=Py_2 \\ | \\ Ci=K_2 \end{matrix} \qquad (4)$$

Again, if one equivalent of ferric citrate be united with one equivalent of calcium hypophosphite, the resulting grass-green solution on concentration yields an amorphous compound, capable of being scaled, and is represented by the formula:—

$$\begin{matrix} Fe—Py_2 \\ \| \quad | \\ Ci-Ca \end{matrix} \qquad (5)$$

But if one equivalent of ferric citrate be treated in solution with two equivalents of calcium hypophosphite, the solution contains a grass-green amorphous compound, which may be obtained in scales and is represented thus:—

$$\begin{matrix} Ca—Py_2 \\ | \quad | \\ Ci—Fe \\ | \quad | \\ Ca—Py_2 \end{matrix} \qquad (6)$$

It will be seen from the foregoing results that the compounds represented by the first, third and fifth constitutional formulas cannot exist in solution with a free hypophosphite as the inevitable result will be, the formation of the compounds represented by the second, fourth and sixth formulas, respectively. It is also found that if a hypophosphite be added to a solution of either of the latter compounds, chemical union does not take place and the solution on evaporation will deposit the hypophosphite in crystals. This reaction will explain the formation of crystals of sodium hypophosphite in addition to the amorphous compound on dissolving one equivalent of ferric hypophosphite in a solution of one equivalent of sodium citrate; and the similar reaction attendant on the use of potassium citrate.

It is evident, therefore, that if ferric citrate be dissolved in a solution of an excess of the hypophosphites of calcium, sodium and potassium, one or more, perhaps all of the compounds represented by the second, fourth and sixth graphic formulas will be formed. The absolute stability and free solubility of these compounds, even in the presence of a large excess of free hypophosphites, and the fine green colour of the solution consequent on their presence, are certainly sufficiently good reasons for the recommendation of the use of ferric citrate in the preparation of syrup of hypophosphite with iron.

In addition to the process ordered in the Pharmacopœia for the preparation of syrup of hypophosphites, which consists merely in solution, other methods are in

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* A brief abstract of the experiments with lycaconitine will be published shortly.

† From the *American Journal of Pharmacy*, July, 1884.

vogue, which depend on double decomposition, including the so-called sulphate and carbonate processes.

Comments on the process ordered in the Pharmacopœia are unnecessary. The sulphate process may well be passed by on account of the impurity of the product, consequent on the solubility of calcium sulphate. The carbonates of sodium and potassium, because of their indefiniteness, the impurities they always contain and the bulkiness of the resulting calcium carbonate, may well be replaced by the corresponding bicarbonates, which are definite and far less liable to contamination. By employing the bicarbonates calcium bicarbonate is momentarily formed, and on being decomposed the resulting carbonate is dense and crystalline, thereby lessening the liability to loss of the liquid by absorption as well as facilitating filtration. When a moderately dilute solution of calcium hypophosphite is mixed with a solution of sodium bicarbonate no decomposition takes place. Even after standing several hours the liquid remains clear and retains its alkalinity; but when heated a few minutes the calcium carbonate is precipitated. It is a noticeable fact that under similar conditions potassium bicarbonate parts with its carbonic acid much more readily than the sodium salt does; the solution is at first clear, but soon deposits the calcium carbonate. It is therefore necessary in order to ensure the complete decomposition of the sodium bicarbonate to employ a saturated solution of calcium hypophosphite. It is also necessary to heat the solution until action has entirely ceased before adding the potassium bicarbonate, which readily and rapidly decomposes.

The composition of the preparation made by the following formula is almost identical with that made by the process ordered in the U.S. Pharmacopœia, each fluid drachm containing three grains of calcium hypophosphite and one grain each of the hypophosphites of sodium and potassium, and is sufficiently palatable without the aid of flavouring. The preparation contains the same amount of metallic iron as the Pharmacopœia orders.

Calcium hypophosphite	554 parts (or 591 grains).
Sodium bicarbonate .	95 parts (or 101 grains).
Potassium bicarbonate.	115 parts (or 123 grains).
Ferric citrate. . . .	85 parts (or 91 grains).
Sugar, powdered . .	4050 parts (or 9 troy ounces).
Water, a sufficient quantity to make .	10,000 parts (or 16 fluid ounces).

Dissolve the calcium hypophosphite previously reduced to a fine powder in 3500 parts (or 8 fluid ounces) of water with the aid of heat, and add to the solution the sodium bicarbonate, continuing the heat until action has entirely ceased. After removing the solution from the heat add the potassium bicarbonate in small portions, waiting after each addition until effervescence has ceased before adding more. When action has entirely ceased filter the liquid through paper. After the liquid has ceased to drop add enough water through the filter to make the filtrate weigh 5850 parts (or measure 10 fluid ounces). In 1200 parts (or 2 fluid ounces) of this liquid dissolve the ferric citrate with the aid of heat, and add the solution to the balance of the liquid. In this solution dissolve the sugar with or without the aid of heat and filter through paper, adding through the filter enough water to make the completed syrup weigh 10,000 parts (or measure 16 fluid ounces).

DETECTION OF BRUCINE AND STRYCHNINE.

The following tests for these substances are proposed by Dr. O. Lindt (*Zeitschrift für wissenschaftliche Mikroscopie*). For brucine a convenient test is selenic acid containing nitric acid (5 drops selenic acid of sp. gr. 1·4, and 1 to 2 drops nitric acid of sp. gr. 1·2). If the fatty oil is first removed from sections of *Strychnos Nux-vomica* and *S. Ignatii* by petroleum ether, and this reagent used, the laminated cell-walls quickly take a bright red colour which gradually turns to orange and yellow, while the cell-cavity and the granular substance contained in it remain uncoloured, indicating the absence of brucine. Nitric acid alone does not answer, the coloration of the alkaloid being masked by the formation of xanthoproteic acid.

For the detection of strychnine, Lindt discards the potassium bichromate reaction, because the violet colour is developed only in immediate contact with the crystal, and the solution of strychnine in sulphuric acid escapes so rapidly from the preparation that no conclusion can be formed from a subsequent staining as to the original position of the alkaloid. But it is readily shown by a solution of ceroxide sulphate in sulphuric acid, if the fatty oil, grape sugar and brucine have first been removed by maceration in petroleum ether and absolute alcohol. If added immediately before the observation is made, the reagent imparts a violet-blue colour to all the thickening layers of the cell-walls. But the colour rapidly disappears, while the deposits of albumen assume a blueish opalescent tint which finally turns to a reddish-violet. The interior of the cell takes an intense red colour. The reagent retains its activity for a considerable time.

The author objects to Borscow's microchemical test for veratrine on the ground that the change of colour may be due to the fatty oil. The fatty oil contained in the sieve-portion of the bulb-scales of *Colchicum autumnale* gives the characteristic reaction for colchicine with sulphuric and nitric acid; but this reaction fails if the fatty oil is first removed from the section.

DIETETIC DELUSIONS: THEIR DELETERIOUS EFFECTS, AND THEIR RECTIFICATION.*

BY R. M. HODGES, M.D.

The amount of food required by a healthy adult will surprise most persons, even those who are good feeders. While this varies with the work performed, the heat or cold of the weather, and the condition and quality of the food taken, it has been estimated that, in the case of a man in health and of average size, the total daily ration should weigh 6 pounds 13 ounces 128 grains, of which 1 pound 4 ounces 245 grains consist of dry food substance, the remaining $5\frac{1}{2}$ pounds being water.†

* Read before the Boston Society for Medical Improvement, June 9, 1884. From the *Boston Medical and Surgical Journal*, July 10, 1884.

† Under ordinary circumstances a daily ration should contain something like the following proportions and quantities of its main ingredients:—

Water	5 lbs. 8 oz. 320 grs.
Albuminoids or flesh formers	0 lbs. 4 oz. 110 grs.
Starch, sugar, etc. . . .	0 lbs. 11 oz. 178 grs.
Fat	0 lbs. 3 oz. 337 grs.
Common salt	0 lbs. 0 oz. 325 grs.
Phosphates, potash, salts, etc.	0 lbs. 0 ozs. 170 grs.

This might be furnished by a mixed diet of the following foods:—

Bread	18 oz.	Altogether these quantities will contain about 1 lb. $5\frac{3}{4}$ oz. of dry substance, though they weigh in all 6 lbs. $14\frac{1}{2}$ oz.
Butter	1 oz.	
Milk	4 oz.	
Bacon	2 oz.	
Potatoes	8 oz.	
Cabbage	6 oz.	
Cheese	$3\frac{1}{2}$ oz.	
Sugar	1 oz.	
Salt	$\frac{3}{4}$ oz.	
Water alone and in tea, coffee, beer, etc.	$66\frac{1}{4}$ oz.	

It will be seen that the weight of this allotment exceeds by 1 ounce—even when the solid matter contained in beverages is omitted—that of the analytic table which precedes it. This excess is mainly owing to the fact that in all articles of food actually used there are small quantities of matters (cellulose, etc.), which cannot be reckoned as having a real feeding value.—A. H. Church, 'Food: Some Account of its Sources, Constituents, and Uses,' London, 1880, p. 49, *et seq.*

Authorities on the subject of diet say that nitrogen is the most essential of all foods, and that a certain amount, about 316 grains, should be taken daily by an adult man. If the minimum quantity of nitrogen (which, for the sake of argument, may be put as low as 250 grains) be not consumed, the various functions of the body languish, and a degree of weakness is induced, with greater or less rapidity, according as the quantity falls much or little below 250 grains per diem. But let the consumption drop to an average of only 138 grains, which is the smallest amount necessary for the bare maintenance of life, and in a year or two (not at once, for every body contains a store of nitrogen) important modifications of the nutritive processes, with distinct predispositions to disease, will inevitably be established.*

These results of experimental investigation have a practical significance. They find expression in the fact that a failure to consume all the essential elements of full rations, whether nitrogenous or non-nitrogenous, will sooner or later, as in the disastrous Irish and Lancashire famines, give rise to a train of symptoms which have been justly denominated those of "chronic starvation."

From the small knowledge of the value of food possessed by individuals as well as the public,† a diminution in its adequate supply easily escapes attention; loss of appetite is looked upon with indifference, and the first steps are inadvertently taken towards a condition which is as full of meaning in the case of a single person as when a whole community are its subjects. The absence or the keenness of appetite affords no indication of the amount of food which the stomach will digest and the body assimilate or an individual be benefited by swallowing.

The body requires not only to be fed but filled; and the object of eating is as often to bring up past arrears as to supply present demands. Quality of food, with all the heat and force it may contain, will not make up for quantity, which is required for constructive and reparative purposes. The constant waste of flesh and blood can only be compensated for by an equivalent assimilation of actual materials. Yet, in spite of this self-evident proposition, a large proportion of the better educated classes of the community readily deceive themselves and mislead others in regard to the amount of food necessary for their welfare and nutrition.

From a practice, often beginning in infancy with the common maternal prejudice against giving solid food at a sufficiently early period and in adequate amount, persisted in through childhood from an erroneous idea that "meat once a day" is an ample supply of animal food, still continued during adolescence, especially in the case of girls, under the conceit that eating heartily, or "between meals," is neither wholesome nor lady-like, a habit of going without enough sustenance is finally established in adult life which is further perpetuated and confirmed by a great variety of influences. Among the more common may be mentioned personal temperament, disturbed mental conditions, languid in-door life, fatigue and exhaustion, theoretical dietetic prejudices, fastidiousness as to eatables, unwise distribution of meals, insufficient variety of food, too rigid domestic economy and pre-eminently the revived fashion of tight lacing. These, and a multitude of similar agencies, apart from pathological derangements, are well-recognized causes of deficient bodily nourishment, and prolific sources of disturbed health, revealing themselves in deficient weight, "weakness," anæmia, feeble circulation, neuralgia, cough and throat trouble, constipation, headache, backache, nausea, and a variety of phenomena, unconnected with sensible organic alterations, but characterized by neurotic and functional symptoms easily magnified by the patient and overtreated by the physician.

The consequences of an insufficient dietary are most frequently exemplified in young people, of both sexes, growing school children, boys fitting for college, *débutantes* in society, young mothers of families, seamstresses, shop girls, etc.; and, although they also appear at other periods of life, and under other circumstances than those which have been enumerated, it is during the years of adolescence that the utilization of feeding has its supreme value, and its prophylactic and curative effects, as a therapeutic method, are most easily obtained. Sir Andrew Clark, Mr. Grailly Hewett, Mr. Clifford Allbutt, and others who have described the ailments which follow inadequate alimentation, have especially urged the necessity for greater attention to the question of diet in the bringing up of families.

The underfed constitute so considerable a class that a large part of medical practice is devoted to attempts at satisfying their importunate demands for "something which shall make them feel better." To attack with drugs symptoms which are daily regenerated by starvation is labour in vain, so long as that condition is permitted to exist. But if the famished tissues of those who say they are not sick, and there is nothing the matter with them, only that they "do not feel well," and "cannot eat," be permeated with the fat which is so often loathed in food,—if veins be filled with a more bounteous supply of blood, and if out-door air be made attainable without the expenditure of an already slender supply of strength,—their bodily functions will take on renewed vigour and be reanimated from better life-giving resources, force will be stored up, energy will be developed, and innumerable discomforts evicted. The futile use of iron, quinine, bitters, elixirs, and other so-called "tonics," either when self-prescribed or methodically directed by physicians, and the insuccess of medicines, as a rule, to relieve the wearisome complaints daily listened to from persons whose mode of living is an injustice to themselves, do not always serve as a reminder that suitable nutriment, in some form or other, is the only real "tonic," and that its methodical consumption can alone relieve the protean afflictions of many, if not most, of these querulous supplicants. To say to them in a vague and general way that a nourishing diet should be taken, and that anxiety and overwork are to be avoided, is to give weak advice. The most rigid and literal obedience to fixed and precise rules in regard to the quantity and character of their food and the times of taking it—in fact, the carrying out of a process of "stuffing," practised at short intervals of time, without regard

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* Parkes, 'Practical Hygiene,' p. 173, *et seq.* Gr. Hewett, *British Medical Journal*, August 4, 1883, p. 225.

† The manufacturers of cellulose and paper pulp propose, by an advancement of scientific cookery, to resolve nutshells, wood shavings, and sawdust into wholesome and digestible food. They remind us that a pear, which when full grown in autumn is little better than a lump of acidulated wood, with careful storing for two or three months, becomes, by nature's unaided cookery, the most delicate and juicy pulp which can be tasted or imagined; and that cotton and linen rags have been converted into sugar artificially in the laboratory of the chemist.—*Paper Maker's Monthly Journal*, February 15, 1884, p. 49.

At the existing (1884) International Health Exhibition, London, the "Vegetarian Society" are furnishing a sixpenny dinner to four or five hundred people daily. From a carefully kept account of the substances used for the bill of fare the following "food equivalents" have been reduced, showing that each diner receives, of—

Albuminoids	·63 oz.
Fat	·44 oz.
Carbohydrates	3·17 oz.
Mineral matters	·09 oz.

Physiologists lay down the standard diet for ordinary labour pretty much as follows:—

Albuminoids	4·2 oz.
Fat	1·6 oz.
Carbohydrates	18·7 oz.
Mineral matters	1·0 oz.

It appears, therefore, that it would require about six of the sixpenny dinners to support a man during a day's hard labour.—*Medical Times and Gazette*, May 24, 1884, p. 712.

to appetite and pushed to the stomach's maximum capacity of digestion—is necessary to extricate them from their deplorable situation.

It is not my purpose to describe in detail the ailments and functional irregularities which are successfully dealt with by dietary treatment, but to make some criticisms on prevalent habits of eating, to offer certain practical suggestions in regard to methods of improving them, and a few homely remarks on the extent to which feeding beyond inclination may be advantageously pushed, and the kinds of food, and its adjuncts, by which its effective adoption may be promoted.

The theoretical standard of a full ration has been given. The conventional standard, however, is an unsettled one. The statement that a person eats as much as other members of his or her family may mean a great deal or nothing, for there are large and small eaters both by habit as well as by example, and there can be no criterion of the amount proper to be eaten under given circumstances except that which is determined by a physician's judgment. This amount, as has been said, should not only be specified exactly, but its consumption insured, and nothing but precise and positive evidence accepted in regard to the fulfilment of the specifications given.

To secure a constant and sufficient conversion of food material by those who are or have been insufficiently fed vigilant supervision is often requisite. The personal influence which accomplishes this is a variable possession. Some persons can win obedience where others might capitulate, and will exhibit a persistency in carrying out thier suggestions which makes successful feeding a certainty when more lenient and compromising tactics would fail. Enfeebled subjects, especially women, often feel a great satisfaction in being controlled, and in being led, lifted, pushed by a strong will. With such individuals resolute oversight tells. That which they say in regard to eating they "cannot do" they are made to do. When they think they "do their best" they are compelled to do more and better, and an assertion that they will "try" to eat is counterbalanced by a determination that they shall succeed. No symptoms of the feebleness which results from being underfed is more characteristic of the condition than the almost invariable obstinacy of its subjects to accept advice which suggests an increase in their consumption of nutriment, and no steps in securing a mutual understanding between physician and patient are so difficult as those directed to overcoming the dogged resolution and pertinacity which are manifested in this respect.

As a stomach may become over-distended and permanently dilated by long gluttony or by the accumulated ingesta which a slow and feeble peristalsis refuses to move on, so may it also become contracted from the habitual want of sufficient victualing, sometimes to such a degree that the introduction of enough food can only be accomplished after the gradual dilatation of its receptacle. This may be effected by increasing the frequency of meals. The custom, common in this country, of leaving a long interval between them is the reverse of that desirable for those who require extra feeding. The ordinary European arrangement adopts a system which is worthy of imitation, a "little and often" being the motto of the eater. It is useless to attempt too much at one time. The stomach conforms slowly, and rebels at a certain limit, but a brief respite and a short intermission put it in a less antagonistic attitude. If, for the reasons given, or from mere disinclination, two meals have been all which the subject under treatment declares can be "got down," as is often the case, then three must be taken or the time between successive feedings shortened to two hours, according to the aggregate amount of nourishment intended to be given and the readiness with which its forced consumption is effected. It is an advantage, therefore, that certain periods of the day, not precisely fixed, but approximative, should be established as meal times. For instance, before rising, at the usual breakfast hour, in the middle of the forenoon, at the accustomed luncheon, in the middle of the afternoon, at the regular dinner, and on going to bed.

It is a common impression that to take food immediately before going to bed and to sleep is unwise. Such a suggestion is answered by a reminder that the instinct of animals prompts them to sleep as soon as they have eaten; and in summer an after-dinner nap, especially when that meal is taken at midday, is a luxury indulged in by many. Neither darkness nor season of the year alters the conditions. If the ordinary hour of the evening meal is six or seven o'clock, and of the first morning meal seven or eight o'clock, an interval of twelve hours, or more, elapses without food, and for persons whose nutrition is at fault this is altogether too long a period for fasting. That such an interval without food is permitted explains many a restless night, and much of the head and backache, and the languid, half-rested condition on rising, which is accompanied by no appetite for breakfast. This meal itself often dissipates these sensations. It is, therefore, desirable, if not essential, when nutriment is to be crowded, that the last thing before going to bed should be the taking of food. Sleeplessness is often caused by starvation, and a tumbler of milk, if drank in the middle of the night, will often put people to sleep when hypnotics would fail of their purpose.* Food before rising is an equally important expedient. It supplies strength for bathing and dressing, laborious and wearisome tasks for the underfed, and is a better morning "pick-me-up" than any hackneyed "tonic."

That the particular food is alleged to be unpalatable, or the hour at which it is to be taken inconvenient, is of no importance. Indeed, it sometimes lends a helping hand to have each mouthful considered the equivalent of a dose of medicine. A tablespoonful of cod liver oil is often taken regularly and amiably when even the smallest quantity of some inviting delicacy will not be swallowed. It is a matter of observation, says Mr. Francis Galton, "that well-washed and combed domestic pets grow dull. They miss the stimulus of fleas." The energy required to dispose of that which is disagreeable is often a discipline of great service to certain classes of persons. Their faculties need to be whipped and spurred to prevent them from perishing by disuse, and the degree of vigour capable of being generated is often proportionate to the amount of coercion to which they are subjected.

The rugged way, however, may be smoothed by various procedures, and need not be made unnecessarily hard to travel. It is helped by selecting food containing the most nourishment and the least bulk, and which is easiest to swallow after a minimum of mastication, or without any. The culinary art facilitates the ingestion as well as the digestion of meats, which, without its cajolery, might be tough and uninviting. Skilful feeding by a nurse who recognizes the art which may be exhibited in coaxing food into the stomach is often of advantage. Food thus administered must be introduced in large mouthfuls. Every *gourmet* knows how necessary this is for the satisfaction of the palate, and the correctness of the fact is substantiated by reason and by analogy. Well-shaped, wisely-seasoned, large morsels make a relishing and appetizing mouthful, inviting repetition. In divided bits they quickly satiate or excite repugnance. By this epicurean method the stomach is rapidly and persuasively charged with a sufficient supply of nourishment, as it never can be by the feeble pickings of an apathetic eater. *L'appetit vient en mangeant* is a

* It should be borne in mind that a full bladder is a frequent cause of early morning wakefulness. Rising and passing water will often send restless sleepers back to bed for a refreshing nap, which without relief from this source of reflex irritation would not have occurred.

paradoxical adage constantly verified. Not only mere disinclination to eat is often successfully overcome by persistent feeding, but a liking for, and dependence upon, full and hearty meals is established, and, what is more, retained.

In cases where food is urgently called for its artificia introduction is an easy and beneficial manœuvre. It does not require a stomach tube, and has but little resemblance to the procedure resorted to with the insane. It may be practised with insignificant discomfort by means of a soft rubber catheter, not exceeding a No. 12 in size, fitted to a small glass tunnel, into which the nutriment is poured, or it may be sent through the tube by a Davidson's syringe. The catheter need enter but a short distance into the œsophagus. If no resistance be offered the operation can be performed by almost anyone, even by the patient himself. Milk, cream, broth, eggs and homogeneous liquids are thus readily deposited, and to the desired extent, in the stomachs of those disinclined to eat.

The number of females, especially those who "do their own work," whose food consists almost wholly of bread and tea, is very large. How inadequately they are nourished is shown by the statement that, in order to get the required amount of aliment persons who eat nothing else must consume about four pounds of bread. As this is so much more than anyone can dispose of with comfort, the practice of eating butter with bread is almost universal. This not only meets the necessity for a heat-producing, non-nitrogenous food, but the unattractive character of dry bread as an eatable is compensated for by the relish of a savory addition. In proportion as the use of butter is increased the requisite quantity of bread may be decreased. To eat "more butter than bread" should not therefore be the reproach to growing children which it is often made, and the large amount of the former which may be profitably disposed of by the underfed, without "disturbing their stomachs," is not surprising if the process by which oleaginous substances are taken into the system is recalled. "Fat, butter, and oily matter in general require no digestion, the emulsion into which they are mechanically converted, chiefly by the pancreatic and duodenal secretions, passes (almost directly) into the general circulation of the blood." For reasons similar to those which make cream and butter such useful articles of diet, and because the habitual food of insufficient eaters is so lacking in fatty matter, cod liver oil has acquired its well-deserved place among therapeutic and alimentary agents.

The tendency of those whose appetite is deficient to lay great stress upon their readiness to take food which does not require mastication makes them willing consumers of soup. And yet of all articles entering into the common dietary soups are perhaps the most deceptive, and certainly the most important to discountenance with the underfed. They fill up the stomach at the expense of solid "staying" nourishment, and contain so little in the way of sustenance that they are therapeutically almost worthless. As a rule they are but some form of meat tea, and are now known to have a food value not unlike that which urine would possess, were it drank, and which they resemble chemically. "They may have on the system a stimulant action somewhat analogous to theine. They may render more prompt and efficacious the assimilation of any wholesome food with which they may be associated, and they may even give so effective a fillip to an exhausted system as to enable it to dispense for a time with real food, but it is clear that they must not be looked to for direct nutrition."* The established use of *bouillon* at lunches and "Germans," and of a "clear soup" at the commencement of dinner, is thus accounted for; and it is only in a sense, such as has just been indicated, that the Crimean saying, "Soup makes a soldier," has any justification in fact.

(*To be continued.*)

PATENT MEDICINE STAMP ACT.

The following is the copy of a letter to which reference has been repeatedly made in the public prints:—

"Inland Revenue, Somerset House, London, W.C.

"*May* 17*th*, 1884.

"Gentlemen,—The Board of Inland Revenue have reason to believe that some misapprehension is prevalent with regard to the liability to stamp duty of foreign medicines imported into this country and subsequently exported for sale abroad.

"In these circumstances they have directed me to point out to you and to the other principal dealers in patent medicines and propreitary articles that all foreign medicines (except pure drugs) are liable to stamp duty, and that if exported by English houses to meet orders received from abroad, or from Ireland, the Isle of Man, or the Channel Islands, they must be stamped.

"Where, however, an English house merely acts as agent for the foreign manufacturer and passes on medicines in bulk to other agents residing out of Great Britain without any actual sale taking place, a stamp is not required.

"I enclose for your information extracts from the Acts of Parliament imposing and regulating the medicine duty.

"I am, etc.,

"W. H. Cousins."

PETITIONS AGAINST THE MEDICAL BILL.

The following is a continuation of the list of petitions from the 23rd to the 29th of July inclusive.

July 23.

	Signatures.
Medical Practitioners residing at Warrington (*Mr. M'Minnies*)	4
— Maidstone (*Mr. Alexander Ross*)	15
— Penzance (*Mr. Vivian*)	10
Pharmaceutical Chemists and Chemists and Druggists of Oswestry (*Mr. Leighton*)	7
— Warrington (*Mr. M'Minnies*)	12
— Maidstone (*Mr. Alexander Ross*)	15

July 24.

Medical Practitioners of Bridport (*Mr. Floyer*) ...	3
Pharmaceutical Chemists and Chemists and Druggists of Ilfracombe (*Sir Thomas Dyke Acland*)...	5
— Plymouth and other places (*Mr. Edward Clarke*)	35
— Bridport (*Mr. Floyer*)	3

July 25.

Medical Practitioners of Hampstead (*Lord George Hamilton*)	20
— Brentford (*Lord George Hamilton*)	5
— Reading (*Mr. Lefevre*)	22
— Camberwell (*Sir William M'Arthur*)	7
Chemists and Druggists of Hertford (*Mr. Arthur Balfour*)	6
— Hastings (*Sir Thomas Brassey*)	24
— Wednesbury (*Me. Brogden*)	7
— Hampstead (*Lord George Hamilton*)	18
— Brentford (*Lord George Hamilton*)	4
— Cambridge (*Mr. Fowler*)	19
— Camberwell (*Sir William M'Arthur*)	8

July 28.

Medical Practitioners of Selby (*Sir Andrew Fairburn*)	3
Pharmaceutical Chemists and Chemists and Druggists of Harrogate (*Sir Andrew Fairbairn*) ...	12
— Selby (*Sir Andrew Fairbairn*)	6

July 29.

Medical Practitioners of Warwick (*Sir C. Forster*)...	6
Pharmaceutical Chemists and Chemists and Druggists of Warwick (*Sir Charles Forster*)	10

The Pharmaceutical Journal.

SATURDAY, AUGUST 9, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelop s indorsed "Pharm. Journ."*

THE BRITISH MEDICAL ASSOCIATION ON PHARMACOPŒIA REVISION AND PATENT MEDICINES.

ONE of the events in connection with the recent meeting of the British Medical Association in Belfast, to which attention was early directed as likely to form a special feature, was the institution of a new Section of Pharmacology and Therapeutics. The first part of the title at least was suggestive that the section would sometimes deal in subjects reaching to the border land of pharmacy, and, indeed, a certain amount of languid interest was created when it was stated with a show of authority that some eminent pharmacists had received and accepted an invitation to be present at the meeting of the Section and take part in the discussions. It is understood, however, that this announcement was premature, and the arrangement eventually fell through; probably it is just as well in the interest of pharmacy that it did, as pharmacists will now be left free to exercise an independent judgment upon topics in which they, as well as medical men, are concerned. Two such subjects appear to have been discussed and dealt with in the Section this year, though little beyond the resolutions agreed to and formally reported to the Association at its concluding general meeting is at present before us.

The first of these resolutions was concerning the British Pharmacopœia. It expressed the opinion of the Section that the present condition of that work is not satisfactory, and it requested the Council of the British Medical Association to consider, with as little delay as possible, what steps should be taken to ensure that the proposed new edition shall be brought into more complete accord with the present state of medical knowledge. Whatever may prove to be the grounds medical men have for dissatisfaction with the British Pharmacopœia we think it decidedly advantageous that their attention should be directed to the subject of the compilation of that work, and we think that it may be fairly claimed that the Council of the Pharmaceutical Society, in its efforts to secure the amendment of the Medical Bill in respect to the provision relating to the Pharmacopœia Committee, has contributed in no small degree to dispel the indifference that has too long been manifested towards a very important subject. It will surprise many of our readers to learn that although the publication of the list of petitions against the Medical Bill has not yet been completed, it already includes, besides the numerous petitions signed by pharmacists only, more than one hundred other petitions, representing the signatures of more than a thousand medical men. It may be said that the sympathy of members of the medical profession throughout the country with the claim of pharmacists to be directly represented on the Pharmacopœia Committee has everywhere been very marked, and the signature of the petition has frequently been accompanied by an expression of surprise drawn forth by the revelation as to the conditions under which the legal text book of materia medica and pharmacy is at present compiled. Indeed, so strongly does the subject appear to have become impressed upon the minds of some of the leaders of the medical profession, that there are signs of an inclination to follow the lead of the Pharmaceutical Society and put forward a claim on behalf of the British Medical Association for representation on the Committee. The organ of the Association, describing in an editorial the steps actually taken, says that a Committee, consisting of Dr. MACLAGAN, Professor HAY, Dr. WHITLA and Dr. MURRELL, was appointed by the Section of Pharmacology and Therapeutics to work with a sub-committee of the Council of the Association "and take immediate steps to have the views "of the great body of the profession (which now "practically means the British Medical Association) "represented in the compilation of our proposed "new Pharmacopœia." Admittedly the final decision as to the articles of materia medica that should be included in an official pharmacopœia lies exclusively within the province of the medical profession; but it may be remarked that evidently there exists even there a wide divergence of opinion upon the subject. In a recent letter to the *British Medical Journal* Dr. FARQUHARSON advocates the vigorous application of the pruning knife, so as to reduce the size of the book by at least one-third, which he says might be done without impairing its efficiency. Among the articles he selects for objurgation are dulcamara, mezereon, sassafras, sarsaparilla, hemidesmus, canella, cusparia, krameria, serpentaria, and what he calls "other rubbish of the kind," all preparations of conium but the succus, all the vapours, chloroform water, many of the "more fancy varieties of iron and mercury," and phosphorus, unless perhaps a preparation can be devised allowing it to be prescribed in an unaltered state. On the other hand, during the meeting of the Section the propriety was discussed of the Association organizing some means for establishing a Supplemental Pharmacopœia, or "semi-official list of remedies" of which the actions are not sufficiently tested to give them a place in the Pharmacopœia. The *British Medical Journal* considers that such a list, added to or changed from year to year by the Asso-

ciation, would make the basis for changes to be considered by the sub-committee of the Medical Council at the periodical revisions of the British Pharmacopœia.

The other resolution related to the Patent Medicine Stamp Act, expressing an opinion that its repeal is highly desirable. The reasons given in support of this opinion are three in number (1) that it is unjust to impose a tax on medicines; (2) that the Act as recently interpreted promises to impede the importation and use, especially in hospital practice, of medicines of foreign origin; and (3) that the Government label is taken advantage of by patent medicine manufacturers to give the appearance of Government indorsement to their productions. It will be evident to most of our readers, we think, that one of the most powerful arguments for an alteration of the Patent Medicine Stamp Act, and one in respect to which the members of the medical profession might usefully co-operate with pharmacists for the public welfare, is here conspicuous by its absence; we refer to the facilities which the present law affords for an evasion of the Pharmacy Act by the unrestricted sale of preparations of scheduled poisons in the garb of patent medicines. Considering the amount of declamatory writing that the existing conditions have provoked from medical pens in the past this silence now is somewhat surprising. Indeed, there has been a great appearance of unreality about much that has been recently written and spoken upon the subject of patent medicines. It is probable that the application of the provisions of the Act to medical preparations made abroad but advertised for the relief of disease and sold in this country to the same extent and no further than they are enforced against preparations made in this country and similarly advertised, has caused irritation and roused activity in certain quarters where long exemption had come to be regarded as a right. The effects of this activity have been apparent in more than one effusion that has appeared recently in the technical and general press. Perhaps a severe critic would not be quite unjustified in suggesting that the cloven foot of self-interest has succeeded in thrusting itself right into the midst of the reasons above quoted. However this may be, it is certain that many who have joined in the discussion have manifested intense ignorance of the subject. Thus a letter issued by the inland revenue authorities on the 17th of May has been mysteriously alluded to as being an intolerable interpretation of the Act; but, as stated by the Chancellor of the Exchequer on Thursday, and as will be seen by reference to the letter itself, printed on p. 110, it refers only to foreign medicines imported and afterwards re-exported, and is certainly not of sufficient importance to justify a fit of hysterics. Again, a Member of the College of Physicians, writing under the impression that something has really been done prejudicial to the interests of medicine, says that "a very large number of our most valued preparations are prepared abroad and can only be there prepared, as it is essential that they should be concocted from foreign plants and from them while fresh." And, as if to emphasize the low state to which English manufactures have fallen, he adds, "The alkaloids, such as quinine, morphia, strychnia, atropia, and many more, are better prepared out of this country!" We believe we are correct in saying that even if this be true, no attempt is being made to raise a revenue upon such foreign manufactured chemical compounds when imported into this country.

Whilst referring to the subject, it may be mentioned that the Chancellor of the Exchequer, in replying to a question put in the House of Commons on Thursday, said that he could not hold out any hope that the tax would be repealed, but he had called upon the Inland Revenue Board to report upon the subject and he would study the report carefully. He also expressed an opinion that one of the objections raised to the tax might be met by adopting the French practice of printing on each stamp label a disclaimer that it gives any Government guarantee.

BRITISH PHARMACEUTICAL CONFERENCE.

We are informed by the Honorary General Secretaries of the British Pharmaceutical Conference that in addition to the list of papers published in our last issue the following have also been promised:—

25. Report on the Estimation of the Alkaloids in Atropa Belladonna. By Wyndham R. Dunstan, F.C.S., and F. Ransom.

26. The Preparation of Calcium Sulphide. By T. S. Dymond.

27. The Estimation of Diastase in Malt. By T. S. Dymond.

We may again remind our readers that the meeting takes place at Hastings this year, commencing at 10.30 a.m. on Tuesday, the 12th inst. Members intending to be present, who have not yet secured accommodation, are recommended to communicate at once with Mr. F. Rossiter, the Secretary to the Local Committee, 20, George Street, Hastings, who will be very glad to assist them.

We learn from the *Journal de Pharmacie d'Alsace Lorraine* that two of the men who took part in the assassination of a pharmacist's assistant at Strassburg in October last (see *Pharm. Journ.*, xiv., 368) have been discovered at Vienna, where one of them was under sentence of death for another crime. The prisoners have made a full confession of the Strassburg murder, which they profess to have been one of a series of attacks upon pharmacists in that city that were planned with a view to obtaining funds for carrying on the anarchist agitation as well as a supply of certain poisons for the same organization. In consequence, however, of the alarm created by the first crime the assassins decamped from the city without attempting any others.

The new list of names, published under the provisions of the Ontario Pharmacy Act, of persons registered and entitled to keep open shop as pharmaceutical chemists in that province, contains 432 entries. It may be remarked that the practice of pharmacy in Ontario is strictly limited to registered persons, and that failure to pay the annual renewal registration fee involves removal of the name from the register.

* * *

The Register of Chemists and Druggists and other persons registered under the Sale of Poisons Act in New South Wales for the present year contain four hundred names. In fourteen instances the qualification stated is "Member of the Pharmaceutical Society of Great Britain," and in two other cases the qualification is registration in Great Britain.

* * *

In Victoria the employment of unregistered assistants by chemists and druggists is illegal. Some complaints having been made at a meeting of the Victorian Chemists' Assistants' Association that a number of unregistered persons were being so employed, inquiries were set on foot by the Board of Pharmacy, when it was found that the practice obtained only in dispensaries and similar public institutions. As the managers of these places did not carry on business or exhibit the name or title of chemist or druggist they were not considered to come within the provisions of the Act, but the Registrar was instructed to bring under their notice the desirability of employing only persons holding a certificate from the Board.

* * *

At a meeting of the Société Royale des Sciences Medicales et Naturelles de Bruxelles, held on Monday last, Mr. Thomas Greenish, of London, was unanimously elected a Corresponding Member.

* * *

The directors of the cinchona plantations in Java belonging to the Dutch Government appear to be aspiring to the attainment of a very high standard. In the official report for the first quarter of the present year it is stated that it has been decided henceforth to use in the Government grounds only the seed from Ledgeriana trees which have yielded bark containing at least 9 per cent. of quinine. At present the supply of seed answering to this character does not equal the requirements for home use.

* * *

Another fatal accident during the preparation of oxygen is mentioned in the *Pharmaceutical Record*, as having occurred at Binghampton, New York. It appears that Professor H. A. Clum, of Elmira, was engaged in the preparation of the gas for use in a lecture, when the iron retort burst and a fragment of it was driven into his brain. The apparatus and contents were so completely scattered that the cause of the explosion cannot be stated with certainty, but it is supposed to have been due to choking of the delivery tube.

* * *

According to a recent consular report Persian opium is now imported into China of fair quality and much resembling the Malwa variety. It had become the practice to adulterate the opium before exportation from Persia to such an extent, with sugar and other substances, that its sale in China had been greatly interfered with, but the Persians seem to be now trying the virtue of honesty in assisting them to recover lost ground.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, August 6, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Churchill, Gostling, Greenish, Hampson, Hills, Radley, Savage, Symes, Williams, Woolley and Young.

The minutes of the previous meeting were read and confirmed.

The Inaugural Address.

The President announced that Mr. W. T. Thiselton Dyer, M.A., C.M.S., F.R.G., Assistant Director of the Royal Gardens, Kew, had consented to give the inaugural address to the students in October next.

Resignation of Mr. Bremridge.

The President read the following letter from Mr. Elias Bremridge:—

"New Malden, Surrey,
"*July* 26, 1884.

"The President, Pharmaceutical Society of Great Britain.

"My dear Sir,—I must ask you to do me the favour of accepting and of conveying to the Council my most sincere and heartfelt thanks for all the kind words that you and the Council have been good enough to say of me, as intimated in yours of the 3rd inst., and as reported in the Journal and Transactions of the Society of the 5th inst. It is more than gratifying to have the assurance that I carry with me in my retirement from official duties the good opinion and the cordial good wishes of those with whom I have so long been associated, and whose respect I so highly appreciate. If anything could tend to brighten the remainder of my life it is the very kind manner in which the Council have been pleased to record such services as I may have been able to render, and the handsome provision they have made for my future use and benefit. I feel that I have scarcely merited such generous consideration nor the encomiums placed to my credit. I can only claim the merit (if that be any merit) of having steadily, perhaps with some earnestness and assiduity, endeavoured to do my duty, never overlooking the interest of the Society, nor the objects for which the Society was established. It has been my happiness to have seen some of these objects attained, and I had hoped that before the close of my official career I should have seen the realization of the views and intentions of the founders of the Society, viz., the consolidation of the Society as one compact and united body. I still hope to be spared to see this accomplished. I desire further to convey to the Council an expression of the gratification I feel that my son should have been appointed to succeed me as Secretary and Registrar; moreover, I trust it may not be considered out of place if I venture to express my conviction that he will discharge the duties with intelligence and with untiring devotion to the interest of the Society.

"I have the honour to be,
"My dear Mr. President,
"Ever yours faithfully,
"Elias Bremridge."

The Secretary and Registrar.

A resolution was passed unanimously confirming the appointment of Mr. Richard Bremridge as Secretary and Registrar. Another resolution was passed authorizing him to recover penalties, etc., sued for under the Acts of Parliament, and to this authority the seal of the Society was attached.

The Medical Acts Amendment Bill.

The President, referring to the withdrawal of the Medical Acts Amendment Bill, said it was a great satisfaction to himself, as President, to express his grateful appreciation of the loyal support of every local secretary and member of the Society who had taken an interest in this matter, and also of the very numerous and influential promises of support from members of Parliament which had been received. In fact, he felt pretty confident that had the Bill gone into committee pharmacists would have obtained their object; and if the Bill were again introduced, the education which during the last year or two they had been endeavouring to bestow on various members of Parliament would not be thrown away. He would move—

"That the cordial thanks of the Council be given to the Society's local secretaries and others for their exertions in reference to the proposed amendment of the Medical Acts Amendment Bill."

The Vice-President, in seconding the motion, said he wished it were in the power of the Council to also thank those members of Parliament who had at considerable inconvenience gone night after night to the House when the Bill was expected to come on. He knew that one of the members for his own borough had put himself to very great inconvenience to serve the Society in this way, and he should make it a point to thank him personally.

Mr. Hampson said he could not help expressing his satisfaction at the response which had come, not only from members of Parliament, but from members of the trade generally, during the last few months in relation to the petition work. Of course it was very disappointing that the Bill had to be dropped, but he felt, on the other hand, that all this work was not only educational to members of Parliament, but was also very salutary to the Society, as it gave it an opportunity of feeling its strength and cultivating that strength, which would yet be required in future. He felt sure that although pharmacists had failed twice in a campaign which was of some importance, they had succeeded in making themselves felt and understood; and it only required that they should be properly understood in order to obtain the ends they had in view. The Medical Bill would probably be reintroduced when there was an opportunity of proceeding with home legislation, and there would then be another opportunity to carry out their desires.

Mr. Symes did not think pharmacists had altogether failed—from one point of view they had succeeded. They had succeeded in placing their wants before members of Parliament, and in educating them to these requirements He believed in every case where a communication had been made to a member of Parliament, support had been promised; in fact, the difficulty he had experienced had been to convince people that a claim which was so exceedingly reasonable required any agitation in support of it. One member who presented a petition had written to him since, pointing out that the Bill would no doubt be reintroduced next session, as medical men were very desirous to carry it through; and medical men had told him the same thing; but he suggested that some means should be taken in the interim to communicate with the promoters of the Bill, because after the evidence they must have had before them of the unanimity of opinion, not only amongst pharmacists but also amongst medical men, he could not think they could resist it. Medical men themselves had expressed to him much the same view. He had found no difficulty in obtaining signatures from medical men in Liverpool, for though many of them were away for their holidays some thirty had signed, and had more time been allowed he had no doubt one hundred signatures could easily have been obtained. From what he had heard Mr. Mundella seemed to think that the medical men were against the claim, but having communicated with him, he was almost led to believe from the tone of his very courteous reply, that he was half inclined to give way. He believed, therefore, that had the Bill been proceeded with, the Council would have got all it asked, and would have been considered in doing so to be getting not only what was for the advantage of pharmacists, but for the advantage of the medical profession and indirectly of the public. It must be clear to every one that to have medicines prepared in the most efficient manner and to have a clear understanding between the prescriber and dispenser must be to the advantage of the public. He hoped what had taken place would strengthen the hands of the Council when it went at some future time for pharmaceutical legislation.

The motion was carried unanimously.

The President moved also—

"That the cordial thanks of the Council be offered to members of the medical profession who have supported the claim of pharmacists to be represented on a committee for the revision of the national pharmacopœia."

The Vice-President seconded the motion, which was carried unanimously.

Diplomas.

The following, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Arnott, Daniel.
Callaway, George Frederic.
Clower, John.
Eastes, Ernest John.
Gradidge, James Henry.
Hanson, Christopher.
MacDiarmid, Fraser.
Nicholls, Reginald Edward.
Pierce, Robert Wynne Charles.
Reynolds, Richard Freshfield.
Salmon, Ernest Frederick.
Smith, Samuel Henry.
Wilkinson, Robert.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Eastes, Ernest John .....Deal.
Gradidge, James Henry .....Truro.
Hanson, Christopher .....Bingley.
Nicholls, Reginald Edward ...Lee.
Reynolds, Richard Freshfield ...Leeds.
Salmon, Ernest Frederick .....Brighton.
Smith, Samuel Henry .....Leamington.
Steward, Josiah William .....Bridgnorth.

Chemists and Druggists.

The following Chemists and Druggists who were registered as being in business on their own account before August 1, 1868, having tended their subscriptions for the current year were elected "Members" of the Society:—

Atkins, Edwin .....London.
Defriez, Richard.....Hastings, New Zealand.

ASSOCIATES.

The following, having passed their respective examinations, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Adams, Joseph.....Bristol.
Banks, Alfred .....Stratford-on-Avon.
Barker, William .....Grimsby.
Barrass, Thomas Edward.....Peterborough.
Bayley, Edward George .....Rye.
Brooke, Thomas Noden .....Retford.
Butler, Benjamin Herridge ...Sidcup.
Clark, Thomas James.....London.
Clarke, Walter .....Bromley.

Cripps, Richard Augustus .....Upper Holloway.
Dodd, Richard Jefferson.. .....Sunderland.
Elliott, Horace Herbert .....Stowmarket.
Ellis, Clement .....Tunbridge Wells.
Fisher, George .....Wigton.
Fisher, Isaac .....Liverpool.
Flower, Walter .....Barton-on-Humber.
Gibbons, Alfred John .....London.
Glanville, Henry Charles .....London.
Gray, Alfred Francis ... .Leicester.
Hall, Ernest Edward .....Wednesbury.
Harris, George .....Moseley.
Holme, William Assheton .....Northampton.
Hopper, James Henry.....Ryde.
Huggins, Samuel .....Barnet.
Hughes, John .....Aberystwith.
Hulland, James .....Bath.
Irving, Frederick William .....Donington.
James, Morgan William .....Llandovery.
Jaques, George.....Leeds.
Joint, Francis .....Barnstaple.
Kingan, David .....Dumfries.
Lewis, Rees Martin.....Cheltenham.
Lovely, Charles Newton .....Ipswich.
Moor, George .....Grantham.
Morrison, Charles Orr.....Sheffield.
Neale, George .....Spilsby.
Parker, Henry George.....Kettering.
Peacock, George .. ..Heslerton.
Rookledge, Frederick .....Easingwold.
Rowell, John George .....Headingley.
Rushton, William.....London.
Sanders, Francis Theodore.....Ramsgate.
Smith, Walter .....Irvine.
Stevens, Arthur .....London.
Taylor, Thomas Ernest .....London.
Timm, Edmund .....Goole.
Verdon, Levinous Henry .....Knighton.
Ward, Robert Edward .....Kettering.
Watson, John Winder .....Tunstall.
Webster, Edward.....Hull.
Withers, Herbert Percival .....Penwortham.
Wyatt, Harold .....Bootle.
Young, Herbert Edward.....Binfield.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Baker, William Charles .....Edinburgh.
Bell, William Edward.....Bootle.
Bridgwood, Walter Stuart .....Birmingham.
Button, Arthur Edward .....Lincoln.
Chapman, Thomas William ...Birmingham.
Dibble, Ernest Clement .....Sheffield.
Dodgson, Tom Roper .....Ulverston.
Dumble, William.....Probus.
Filmer, John Honeywood, Jun.Devonport.
Gill, John William .....Guiseley.
Griffiths, John Egbert.....London.
Hull, John William.....Tamworth.
Inglis, Henry .....Kirriemuir.
Jefferson, John.....Carlisle.
Johns, Thomas .....Woolwich.
Marshall, Richard Harrison ...Bradford.
Mason, Robert .....Paisley.
Masters, Henry .....Buxton.
Maxwell, Thomas Wellwood ...Montrose.
Myers, James .....Tadcaster.
Nicholson, Allan Macdonald ...Creetown.
Phillips, Benjamin .....St. Clears.
Rawson, Richard .....Newark-on-Trent.
Sharp, William Ashton .....Owston Ferry.
Spencer, William Byron..... ...Market Rasen.
Stewart, Henry George Wales..New Barnet.
Whittle, George, Jun.....London.

RESTORATIONS.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

ADDITION TO THE REGISTER.

The Registrar reported that—

Richard George Chapman, 42, High Street, Smethwick, having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported by a qualified person, his name had been placed on the Register.

SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

The following list of Superintendents and Deputy-Superintendents of written examinations for the ensuing year was agreed to:—

Aberdeen .....Kay, James Petrie.
Birmingham .....Southall, William.
Brighton .....Gwatkin, James Ross.
Bristol .....Stroud, John.
Cambridge.....Deck, Arthur.
Canterbury ....Bing, Edwin.
Cardiff .....Munday, John.
Carlisle .....Thompson, Andrew.
Carmarthen ..... Davies, Richard Morgan.
Carnarvon .....Lloyd, William.
Cheltenham .....Barron, William.
Darlington.....Robinson, James.
Douglas, Isle of Man .....Brearey, William A.
Dundee .....Hardie, James.
Edinburgh ....Stephenson, John B.
Exeter .....Broom, William Willey
Glasgow.....Kinninmont, Alexander
Guernsey ....Arnold, Adolphus.
Hull .....Bell, Charles Bains.
Inverness .....MacRitchie, David.
Jersey .....Ereaut. John, jun.
Lancaster .....Bagnall, William Henry,
Leeds ....Reynolds, Richard.
Lincoln .....Maltby, Joseph.
Liverpool .....Symes, Charles.
London ....Taylor, George Spratt.
Manchester .....Wilkinson, William.
Newcastle-on-Tyne .....Martin, Nicholas Henry.
Northampton.....Bingley, John.
Norwich.....Sutton, Francis.
Nottingham .....Bolton, Charles Alfred.
Oxford ....Prior, George Thomas.
Peterborough .....Heanley, Marshall.
Sheffield.....Ward, William.
Shrewsbury .....Cross, William Gowen.
Southampton.....Dawson, Oliver Robert.
Truro .....Percy, Thomas Bickle.
Worcester .....Virgo, Charles.
York .....Sowray, Joseph.

DEPUTY-SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

Aberdeen .....Glover William K.
Birmingham ... .Churchill, William John.
Brighton .....Savage, William Wallace.
Bristol .....Pitman, John
Cambridge.....Hoare, William Parker.
Canterbury .....Amos, Daniel.
Cardiff ..... Coleman, Alfred.
Carlisle .....Hallaway, John.
Carmarthen ....Davies, R. Morgan, jun.
Carnarvon .....Jones, John.
Cheltenham .....Fletcher, John.
Darlington..... ....Hutchinson, Rev. E.
Douglas, Isle of Man .....Brearey, Arthur W.
Dundee .....Kerr, Charles
Edinburgh.....Ainslie, William.
Exeter .....Harris, Henry William.
Glasgow.....Davison, Thomas.

Guernsey	Collenette, Adolphus.
Hull	Baynes, James.
Inverness	MacRitchie, David, jun.
Jersey	Ereaut, John.
Lancaster	Wilcock, John.
Leeds	Smeeton, William
Lincoln	Battle, John Scoley.
Liverpool	Sumner, Robert.
London	Moon, Harry.
Manchester	Wilkinson, George.
Newcastle-on-Tyne	Stuart, Charles Edward.
Northampton	Mayger, William D.
Norwich	Corder, Octavius.
Nottingham	Parker, William H.
Oxford	Thurland, Henry.
Peterborough	Buckle, Frank George.
Sheffield	Wilkinson-Newsholme, G. T.
Shrewsbury	Blunt, Thomas P.
Southampton	Spearing, James.
Truro	Anstey, John U.
Worcester	Lunn, Thomas.
York	Wilson, Thomas William.

Reports of Committees.

FINANCE.

The report of this Committee was read and adopted, and sundry accounts were ordered to be paid.

The PRESIDENT, in moving the adoption of the report, explained that it recommended that £800 should be forwarded to the Honorary Treasurer in Scotland to enable him to pay the contractors for the alterations in the Society's new premises in Edinburgh, expenses of removal, etc., on the architect's certificate as the work proceeded.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow of a registered chemist and druggist, aged 65. Applicant has had two previous grants of similar amount; is very weak and unable to earn her living. (Lancashire.)

£10 to the widow of a registered chemist and druggist, aged 62, in business for eleven years. Has three children, one blind and another in a lunatic asylum. (Surrey.)

£10 to the widow of a registered chemist and druggist, aged 49, having six children. Applicant has had two previous grants of like amount. (Middlesex.)

£10 10*s.* to be placed in the Secretary's hands to aid in the election of a child to an orphan asylum.

£5 to a registered chemist and druggist, aged 62, formerly in business for sixteen years. Is feeble and deaf, and has two children dependent on him. (Cumberland.)

£25 to the Secretary's Casual Fund.

One case had been deferred for further inquiries, and another had not been entertained.

The VICE-PRESIDENT, in moving the adoption of the report, drew attention to the tendency which seemed to be increasing, to make renewed applications for assistance within the twelve months. The Committee did not wish to lay down a hard and fast line and say that such applications should never be acceded to, but it would not by any means encourage the practice.

The Council went into committee to discuss the details of some of the cases. On resuming, the report and recommendations were unanimously adopted.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
June.	Day	524	36	9	22
	Evening	157	19	2	8

Circulation of books.	No. of Entries. Town.	Country.	Total.
June	140	38	228

Carriage paid, £1 6*s.* 7*d.*

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Ashwell (L. T.), Companion to the British and American Homœopathic Pharmacopœias, 3rd ed., 1884. From the AUTHOR.

Dragendorff (G.) und H. Spohn, Die Alkaloide des Aconitum Lycoctonum, 1884.

Jacobowsky (G.), Beiträge zur Kenntniss des Alcaloide des Aconitum Lycoctonum, I. Lycaconitin, 1884.

Fridolin, Über Chebulinsäure, etc. From Professor DRAGENDORFF.

Festschrift zum fünften Stiftungs-Feste des Academisch-pharmacognostischen Vereins in Berlin, 1884. From the VEREIN.

Grant (C. S.), West African hygiene, 1882;—2nd ed., 1884.

From H.M.'s SECRETARY OF STATE FOR THE COLONIES.

Lescher (F. H.), Recent Materia Medica, 1884. From the AUTHOR.

Pharmacopœia of the Royal College of Physicians, translated by R. J. Thornton, 2nd ed., 1817. From Mr. ALEXANDER WOOD.

The Committee recommended the purchase of the undermentioned works:—

Mexican Pharmacopœia.

Hungarian Pharmacopœia.

Oldberg (O.) and O. A. Wall, Companion to the United States Pharmacopœia, 1884.

Tait (P. G.), Heat, 1884.

— Light, 1884.

Muter (J.), Organic Materia Medica, latest ed.

The Librarian submitted a list of books for removal from the Library, and it was arranged that the President should look over the list and confirm it as far as he in his judgment should deem fit.

The Committee ordered that the Library and Museum be closed in the evening during August and September, and that they be closed on the bank holidays.

The Committee ordered the purchase of Gmelin's Chemistry, vol. 13, and Mohr and Redwood's Pharmacy, for the Library in Edinburgh.

Curator's Report.

The Curator had reported the attendance in the Museum during June to have been:—

	Total.	Highest.	Lowest.	Average.
Morning	599	46	12	25
Evening	197	14	2	8

Donations.

The following donations to the Museum had been received, and the usual letter of thanks was ordered to be sent to the respective donors:—

Herbarium specimens of the Assafœtida plant (*Ferula Narthex*) and of *Blumea lacera* and *Sphæranthus indicus*, and of the oils of the last two plants. From Dr. DYMOCK.

Specimen of Maltese Elaterium. From Mr. F. BASCOMBE.

Purchases.

Specimens of spurious Cubebs and of Maltese Elaterium have been purchased for distribution to local pharmaceutical associations.

The Professors had attended and reported satisfactorily on their respective classes.

Professor Attfield had submitted the statistics of the Practical Chemistry Class for the past session.

It was recommended by the Committee that Mr. Wyndham Dunstan be appointed Assistant Professor of Chemistry for the ensuing year at a salary of £100 per annum.

The PRESIDENT moved the adoption of the report, which was carried unanimously.

GENERAL PURPOSES.

The report of this Committee included the reports of the Professors of the School of Pharmacy.

Chemistry and Pharmacy.

Professor Redwood had reported that the arrangements made for the delivery by Mr. Wyndham Dunstan of additional lectures on some branches of physics as well as those on organic chemistry in the morning, and the lectures and demonstrations by Mr. Ince on dispensing and other departments of practical pharmacy had worked very satisfactorily and proved beneficial to the students. This had been especially indicated in the sessional examination, the questions for which were framed with the view of rendering the examination more searching and difficult than usual. For this examination there were twelve competitors and the whole of the papers were of a creditable character, most of them highly so. The examination for the bronze medal at the end of the second course was less satisfactory; there being but four competitors, of whom only one attained a position meriting distinction, but that one did very well. The attendance and general conduct of the students had been satisfactory.

Botany and Materia Medica.

Professor Bentley had reported that the number of competitors for prizes was about the average, though several students who had done very well throughout the session did not compete. He had much pleasure in stating that he could report most satisfactorily of the good conduct, punctuality, and regularity of attendance, diligence and progress generally of the students, and the numbers were above those of last year.

The details of the examinations were appended.

With regard to the Herbarium prize there had been only two collections sent in, for which he recommended that a bronze medal be awarded to the first, containing 340 specimens, and a certificate of merit to the second, containing 250 specimens.

PRIZE AWARDS.

The following awards were made on the recommendations of the General Purposes Committee:—

Chemistry and Pharmacy.

[Five months' course.]

Bronze Medal ..... Ernest Henry Barritt.

[Ten months' course.]

Silver Medal ..... Fraser McDiarmid.

Certificates of Honour..... Edward Cullinan. Ernest John Eastes. Robt. Wynne C. Pierce.

Certificates of Merit ..... Reginald Edw. Nicholls. Albert Wilson. Josiah Wm. Steward. Robert Roberts.

Botany and Materia Medica.

[Five months' course.]

Bronze Medal ..... Lewis Walter Hawkins.
Certificate of Merit ..... Ernest Henry Barritt.

[Ten months' course.]

Silver Medal ..... Fraser McDiarmid.

Certificates of Honour..... Robt. Wynne C. Pierce. Ernest John Eastes.

Certificates of Merit..... Josiah Wm. Steward. Equal. Ernest Hy. Barritt. Robert Roberts. Equal. F. Haworth Earle. Richd. Hy. Norman.

Mr. G. F. Callaway also obtained a sufficient number of marks qualifying for a certificate of honour, but having been awarded a certificate of the same value in a former session he is not permitted by the regulations to receive another.

Practical Chemistry.

Silver Medal ..... Ernest John Eastes.

Bronze Medals..... Josiah Wm. Steward. Geo. Frederic Callaway.

Certificates of Merit..... Equal. Rt. Wynne C. Pierce. Fraser McDiarmid. Robert Roberts. Edward Cullinan.

Herbarium Prize.

Bronze Medal ..... Ernest Saville Peck.
Certificate of Merit ..... Charles Granville Wood.

Council Examination Prizes.

Pereira Medal (silver); and Books value £5, presented by Mr. T. H. Hills.

Fraser McDiarmid.

Pharmaceutical Society's Medal (silver); and Books value £3, presented by Mr. T. H. Hills.

Charles Mann Luxmoore.

Pharmaceutical Society's Medal (Bronze); and Books value £2, presented by Mr. T. H. Hills.

John Dolbear.

JACOB BELL MEMORIAL SCHOLARSHIPS.

The Committee appointed to make the award of the Jacob Bell Memorial Scholarships for the ensuing session, subject to the approval of the Council, reported that twenty candidates had presented themselves at the following centres:—Brighton, 1; Bristol, 1; Canterbury, 1; Exeter, 1; Lincoln, 1; Liverpool, 1; London, 7; Manchester, 1; Newcastle-on-Tyne, 1; Nottingham, 2; Sheffield, 1; Worcester, 1; York, 1. Of these, four had obtained more than the minimum number of marks requisite to entitle them to the award.

The envelopes bearing the mottoes of the successful candidates having been opened, their names were found to be

Robert Potts.
and
Edward Ernest Morrall.

Solicitor's Report.

The report of the Committee also contained the usual letter from the Solicitor giving particulars of the progress of cases which had been placed in his hands.

It stated that a penalty of £5 with costs had been recovered from

Frank Cooke, 1, Lewis Terrace, York Road, Battersea, and that

William Beesley, 44, High Street, Banbury,

had paid into court before the hearing of the case two penalties of £5 each with costs.

Several other cases of alleged infringements of the Pharmacy Acts had been considered by the Committee and in most instances proceedings were recommended.

The Committee, having had under its further consideration the appeal of

Joseph Robinson, 334, Alfreton Road, Oldknow Street, Nottingham,

against a decision of the Registrar, recommended that his name be placed on the Register.

The Council went into committee to consider certain portions of the report.

On resuming, the report and recommendations were adopted unanimously, and votes of thanks were passed to the gentlemen who had conducted the examinations for the Jacob Bell Scholarships and Council Examination prizes.

REPORT OF EXAMINATIONS.
July, 1884.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (9th)	7	3	4
„ (10th)	8	5	3
„ (15th)	7	5	2
	— 22	—13	— 9
Minor (9th)	21	8	13
„ (10th)	22	4	18
„ (11th)	27	11	16
„ (15th)	21	10	11
„ (16th)	29	8	21
„ (17th)	26	8	18
„ (18th)	28	11	17
	—174	—60	—114
	196	73	123

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Major	1	0	1
Minor (16th)	12	4	8
„ (17th)	14	9	5
„ (18th)	14	6	8
	—40	—19	—21
	41	19	22

Preliminary Examination.

Candidates examined, 325. Passed, 166. Failed, 159.

Eight certificates received in lieu of the Society's examination.

1 College of Preceptors.
3 University of Cambridge.
1 „ „ Edinburgh.
1 „ „ Glasgow.
2 „ „ Oxford.

Parliamentary and Law Proceedings.

A Disputed Sweet Spirit of Nitre.

An adjourned case of considerable interest came before the Alfreton (Derbyshire) Justices on August 1, the defendant, John Hall, of Somercotes, being summoned at the instance of Colonel Shortt, inspector of weights and measures, for having sold a shillingsworth of sweet spirit of nitre which was found to be destitute of nitrous ether, and nearly valueless as a remedy, and was not of the nature, substance and quality of the article demanded.

At the first hearing of the case Colonel Shortt produced a certificate of analysis from the county analyst, Mr. A. H. Allen, of Sheffield, to the effect that the article in question was destitute of the real nitrous ether.

Mr. W. Fletcher, wholesale chemist, Ilkeston, who supplied the defendant Hall with the nitre, said he had submitted a sample of the same to Dr. Truman, of Nottingham, who stated that it was not destitute of nitrous ether, but that it had deteriorated, and that the deficiency could be accounted for by the fact that the sealed sample consisted of 1 ounce of sweet spirit of nitre in a 10-ounce bottle, and that it had been supplied in the middle of June.

Upon the application of Mr. Fletcher, the Bench allowed the case to be adjourned, that a sample for analysis might be forwarded to Somerset House.

At the adjourned hearing, Mr. Henry Glaisyer, of the firm of Glaisyer and Porter, Birmingham, appeared for the defendant, but Colonel Shortt, immediately upon the case being called, intimated to the Bench that he should, in the face of the report received from Somerset House upon the sample sent for analysis, withdraw from the prosecution.

Mr. Glaisyer, on behalf of the defendant, applied for costs, explaining that that was the first opportunity he or his client had had of knowing the contents of the report from Somerset House, owing to an irregularity on the part of the inspector of weights and measures (Colonel Shortt), who sent the sealed sample for analysis to Somerset House, instead of allowing it to be sent by the magistrates' clerk.

The magistrates refused to allow costs, and upon Mr. Glaisyer asking upon what principle of equity the refusal was based,

The Chairman said that Colonel Shortt had withdrawn from the case, the Bench refused to allow costs, and there was an end of the matter.

Mr. Glaisyer pressed for some opinion from the Bench with regard to the defendant. He thought the defendant should go from that Court without any reflection upon his character as a retailer of drugs.

The Chairman repeated that Colonel Shortt had withdrawn from the case, and that might be taken as equivalent to saying that the defendant had sold a pure article.

Suicide by Morphia.

On Saturday forenoon, Mr. Molesworth, coroner, held an inquest at the Robin Hood Inn, Lees Road, touching the death of James Lees, aged 29, drysalter, of Lees Road.

It appeared from the evidence of Mrs. Lees, that deceased had frequently threatened to commit suicide and had taken drugs or something before, and stated he was going to commit suicide in order to frighten her. They were in a fluid form, but never produced any effect upon him. On Thursday afternoon she saw him take something out of a bottle, but did not know what it was. He said it was for the purpose of destroying his life, but she did not believe him. He was not taken ill until about five o'clock, when he became sleepy, and staggered. She then sent for Dr. Wright, who attended the deceased until his death.

Thomas Poyntz Wright, surgeon, said, on Thursday evening, between half-past five and six o'clock, I was sent for and found the deceased lying in his nightshirt uncovered and unable to speak. When I first went into the room I thought he had been drinking, but on turning him over on his face I found him suffering from some preparation of opium. I at last got him to speak and he said "I have not been drinking." He did not speak again for some time, when I pricked him with a pin, and then he said, "I have taken forty grains of morphia." He afterwards said, "I do not wish to live," and those were the last words he uttered. He died about 12 on Friday morning, in spite of all the efforts adopted for his recovery. The dose he took was an enormous one, and quite enough to kill three or four people. I found a bottle on the drawers which had evidently contained morphia. Morphia generally takes effect within two hours, and in this case I am surprised it had not taken effect sooner. The supposition is, inasmuch as a bottle was found in the bedroom, that he took a second dose. I examined him, and he had the full symptoms of opium poisoning.

The Jury returned a verdict to the effect that the deceased committed suicide by poisoning himself with hydrochlorate of morphia whilst in an unsound state of mind.

Attempted Poisoning by Calomel.

At the Cornwall Summer Assizes, on Wednesday, July 24, before Lord Chief Justice Coleridge, William Saundry, 25, gardener, was indicted for maliciously administering calomel to his wife, Ann Saundry, so as to thereby endanger her life. Prisoner is a gardener, and has acted as a quack doctor. The point of the case was that some calomel was placed in a basin of soup

prepared for Mrs. Saundry by Mrs. E. Pellow, who was an attendant on prisoner's wife when ill, at the direction of prisoner.

Dr. Erskine proved that Mrs. Saundry was unable to attend the assizes because of her continued illness. She had made a declaration on the case in his presence, in which she said her husband had never shown any anger towards her, and she could give no reason why he should wish to poison her. She had made up mixtures for her husband, and since her illness this office had been performed by Mrs. Pellow, prisoner bringing home the materials. Dr. Erskine said he saw Mrs. Saundry when she was suffering from an attack of salivation, resulting from the administration of some preparations of mercury. Her lips and tongue were swollen and ulcerated, she could hardly open her eyes, and her neck was so painfully swollen that she could not move her head. There were severe pains in the stomach, and the flow of saliva was very much increased. For more than a week there was hardly any hope of recovery. He saw some soup given to Mrs. Saundry on June 30, and took it to Mr. Beringer, the county analyst.

Mr. Beringer said he examined some white powder taken from prisoner's house. It contained calomel. In the soup he found two grains of sediment—practically calomel. He also found calomel in some urine and saliva.

H. J. Gay, an apprentice at Mrs. Hall's, chemist's shop, Camborne, stated that early in May prisoner purchased some calomel, bitter apples and dragon's blood at the shop; it was labelled "Poison."

W. J. Nicholls, apprentice at Mr. Fiddick's, chemist, Camborne, testified that prisoner bought some calomel at that shop on June 28.

Mr. St. Aubyn urged for the defence that on the wife's own statement the prisoner had proved a kind husband, and that if he had intended to poison his wife it was most unlikely he would have openly purchased calomel.

The learned Judge, in summing up said it had not been disputed that prisoner knew the effect of calomel, and that there was calomel in the house. Further, it was certain someone had put calomel in the soup, although on the particular day to which the indictment referred, Mrs. Saundry did not take any of the preparation. Had she done so the consequences might have been grave indeed. The jury must be guided by the moral probabilities of the case.

The Jury being unable to agree were locked up for some time. On returning into Court the foreman announced that they found prisoner guilty.

His Lordship, in sentencing prisoner, said that he had not a shadow of doubt that he had many times previously attempted to poison his wife. He entirely concurred in the verdict of the Jury. He should sentence him to two years' imprisonment with hard labour.—*Western Morning News.*

Review.

ON THE FORMATION OF URIC ACID IN ANIMALS: ITS RELATION TO GOUT AND GRAVEL.* By P. W. LATHAM, M.A., M.D., F.R.C.P., Downing Professor of Medicine in the University of Cambridge.

This *brochure*, which originally formed the substance of a paper read before the Cambridge Medical Society, is the work of a physician who is also, though not professedly, a chemist. Professor Latham has shown by this book that he is a chemist in the most important sense of that word, that he is one who has a firm grasp of the fundamental principles of the science, and knows how to apply them in elucidating complex chemical reactions. This is perhaps the first and foremost function of the chemist who, as a scientific man, makes the inductive guess that necessarily precedes the experiment by which it is tested, and which in the last resort gives it *raison d'etre* as fact.

It is now well known that in the living organism glycocine undergoes two important transformations; first, through the blood into urea, second, by the agency of the kidney into hippuric acid. The former reaction is not yet fully understood, the latter is less complicated and has a bearing that is at once interesting and important. Hippuric acid may be termed a benzoate of glycocine, and it can be artificially produced by heating together benzoic acid and glycocine to a temperature of 160° C. Under conditions which are at present almost wholly unknown this same reaction takes place within the organism at the normal temperature of 37–38° C. This has been proved by numerous experiments, one of the most conclusive of which was made by Hoffmann, who showed that when benzoic acid and glycocine are added to oxygenized blood and the mixture driven through the vessels of the kidney hippuric acid is formed. It is generally assumed that one of these two transformations constitutes the ultimate destiny of glycocine in the human body. On chemical grounds, Professor Latham points out that there is yet another compound in the formation of which glycocine is largely concerned, namely, uric acid. Years ago Strecker showed that just as hippuric acid yielded benzoic acid and glycocine when heated in sealed tubes with hydrodic acid so uric acid yields, under the same treatment, carbon dioxide, ammonia and glycocine. But it was not until two years ago that Horbaczewski announced that he had succeeded in reversing this reaction and had thus effected the synthesis of uric acid. It was clear from Horbaczewski's paper that by heating glycocine with excess of urea he has obtained a crystalline substance having the principal properties and reactions of uric acid, and thus far his work has been confirmed by Mr. T. S. Dymond whose results were incorporated in a paper read before the School of Pharmacy Students' Association, and subsequently published in this Journal. But neither of these experimenters have obtained uric acid in a sufficiently pure condition to admit of combustion, and when it is remembered that many of the properties of uric acid are also shared by other bodies of similar constitution, until this has been done Horbaczewski's reaction can hardly be considered to be conclusively proved. It appears probable from Horbaczewski's experiment (and this is supported by Strecker's reaction), that the formation of uric acid is due to the action of nascent cyanuric acid (from urea) on glycocine, water being eliminated; in fact that uric acid may be considered to be a cyanurate of glycocine just as hippuric acid is a benzoate of glycocine. But other reactions are possible, and in any case it is extremely improbable that the decomposition can be represented by a single equation. Professor Latham has suggested a series of reactions to explain this synthesis, involving in the first place the formation of biuret (from the urea) which acting on glycocine yields a substance by the dehydration of which a body isomeric with uramil (dialuramide) is obtained. Now dialuramide, as we know, acts upon potassium cyanate, forming the potassium salt of pseudo-uric acid, and the new body acting on ammonium cyanate or urea would theoretically give ammonium urate. Uric acid might further result from a secondary reaction in which glycocyl urea (hydrantoin), through the agency of the kidneys, acts upon biuret, forming ammonium urate.

These suggestions are theoretically correct, and the reactions do not conflict with the very comprehensive formula for uric acid which has been proposed by Medicus. The constitution of uric acid is, however, as yet far from clear, and before Horbaczewski's reaction can be thoroughly understood, much will have to be investigated, not the least important being the constitution of glycocine itself, the true molecular structure of which is certainly not represented by amido-acetic acid. The problem is capable of being attacked from another side, by consider-

* Cambridge: Deighton Bell. 1884. Small 8vo. Pp. 1-25.

ing the derivation of uric acid from xanthine, and its derivatives theobromine and caffeine. Work in this direction has already been commenced by Fischer, whose classical researches upon the constitution of these latter alkaloids specially fit him for the investigation. The solution of the problem from this side has also been much simplified by the strikingly suggestive synthesis of xanthine from hydrocyanic acid which has just been made by Gautier. So much for the chemistry of uric acid.

Professor Latham applies the knowledge of the reactions and properties of uric acid to explain its abnormal appearance in the human subject. Glycocholic acid, a constituent of bile, may be termed a cholate of glycocine. This when saponified, splits up into glycocine and cholic acid; the same reaction occurs in the alimentary canal after the bile has performed its work in digestion, the glycocine being returned to the blood, where it undergoes decomposition, finally being eliminated by the kidneys as urea. Now Professor Latham suggests that if this metabolism of the glycocine is in some way, either wholly or partially, interrupted, but the other amido compounds are still changed to urea, there would then pass into the gland of the liver, both urea and unchanged glycocine. Here it is supposed a reaction would occur, resulting in the formation of hydrantoic acid (glycoluric acid), or an analogous acid, which stands in the same relation to biuret as hydrantoic acid stands to urea. These undergoing dehydration would be converted into hydrantoin and into the isomer of dialuramide, which passing into the circulation might react with urea in the kidney in the way already referred to, giving ammonium urate. Here then, ammonium urate would be produced, and it is easy to understand that this sparingly soluble salt, being in excess, might not be wholly excreted, but passing into the blood would be converted into sodium urate. Gouty deposits are thus at least rendered intelligible. Fundamentally, then, Professor Latham's theory of gout, gravel, and other diseases which are due to the abnormal formation of uric acid in the human system, is that they are due to the inactivity of the liver through which the metabolism of glycocine into urea does not occur. The chemical development of the theory through physiology seems to necessitate certain assumptions that at least require experimental justification. The most important of these is where Professor Latham suggests that the gland of the liver possesses the function of causing glycocine to react on urea with the formation of hydrantoic or an analogous acid. In this connection, Professor Latham brings forward the reaction of glycocine with benzoic acid, which results in the formation of hippuric acid. But is this an analogous case? Passing over the physiological assumption that the liver has the function of conjugating benzoic acid and glycocine, which is far from proved, the chemical reactions in the two cases are radically distinct. The formation of hippuric acid from glycocine and benzoic acid is a reaction which merely involves the elimination of a molecule of water and is strictly analogous to the action of an acid on a base; the formation of hydrantoic acid from glycocine and urea is a reaction of an entirely different order, in which no water is eliminated, but ammonia gas is evolved; in fact, we appear to have here two bases reacting upon each other. It is thus clear that, even assuming that the liver can perform the first reaction, it by no means follows that it can perform the second. This is not the place to discuss the various pathological cases to which Professor Latham applies his theory and shows that it affords a satisfactory explanation.

We must, however, indicate briefly how Professor Latham uses his chemical knowledge in the treatment of these diseases. The abnormal formation of uric acid would be prevented if the unchanged glycocine could be eliminated. It has been already noticed that benzoic acid is capable of reacting on glycocine to form hippuric acid. Professor Latham finds that treatment with benzoic acid or benzoates in large doses is very successful in cases of gout, and considers that its efficacy is due to reaction with the glycocine. The action of many other known remedies for gout and gravel is also discussed, but we will only allude to one more, namely, potassium iodide. Professor Latham assumes that in addition to the solvent action which it exercises upon urates it prevents the reaction between glycocine and urea or other bodies, and thus permits of the existence of free glycocine in the blood. As evidence for this it is noticed that uric acid, when heated with hydriodic acid in sealed tubes to a temperature of 160° C., is decomposed with the formation of carbon dioxide, ammonia and glycocine, and the instance of the formation of hippuric acid proves that these reactions occur at a much lower temperature within the organism. Here, again, we think that analogy is somewhat strained. In the first place there is a great difference between a strong solution of hydriodic acid, on the one hand, and a dilute solution of potassium iodide on the other, and at present there is no evidence that the latter will induce the same reactions within the organism for which, under ordinary conditions, an extremely strong solution of the former is necessary, apart from the increased pressure and temperature. Secondly, the formation of hippuric acid from glycocine is a synthetical reaction, involving the elimination of water; but the formation of glycocine from uric acid is an analytical reaction necessitating the absorption of water, and it does not follow that because the first reaction takes place within the organism that the second will also. In view of these essential differences between the two reactions experimental evidence must be forthcoming before it can be assumed that potassium iodide has this action in the human system. It is not at all improbable that hydrolytic reactions, *i.e.*, reactions where decomposition is effected by absorption of water, such as the conversion of glycocholic acid into glycocine and cholic acid, when they occur within the organism, are brought about by hydrolytic ferments, the importance of which in the connection is apt to be overlooked.

Enough has now been said to show the thoroughly scientific way in which Professor Latham has treated his subject, and the knowledge he has brought to bear upon the facts, and it is only to be regretted that the exigencies of professional life prevent one so well suited for the task from carrying out the experimental work necessary for its completion.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Curious Use of Datura and Hyoscyamus Seeds.

Sir,—Under the heading of the "The Month" in last weeks' issue you notice "a curious use of the seeds of *Datura fastuosa*." The seeds of *Hyoscyamus niger* are very similarly treated by the country folk of Kent for the relief of toothache and facial neuralgia. The seeds are burned by placing them upon hot coals, and the smoke rising is retained by an inverted basin or other suitable vessel. The burning completed the vessel is filled with hot water and the vapour arising allowed to play on the part affected.

Bentley's 'Botany' says "the fruit of *D. sanguinea*, the red thorn apple, is in use among the Indians of the Andes and in Central America in the preparation of narcotic drinks."

9, Tulse Hill, S.W. J. G. Prebble.

Communications, Letters, etc., have been received from Messrs. Storr, Moore, Glaisyer, Swain, Alcock, Braddock, Bracher, Moeller.

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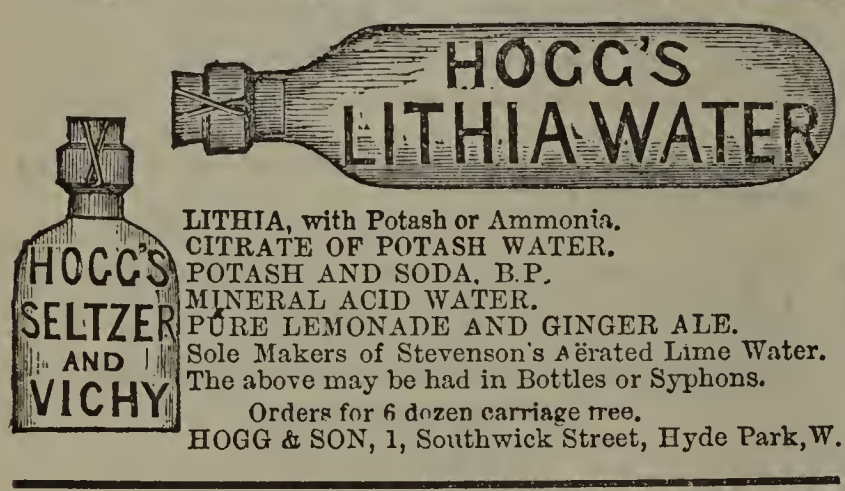
New York :— ROLKER & SONS.



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The above may be had in Bottles or Syphons.
Orders for 6 dozen carriage free.
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MEDICAL PRINTERS,
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PREPARED BY

HAS an acknowledged reputation as an Antimonial, and its value and efficacy is verified by a continued and increasing sale in the Indian Empire. Sold in 1 and 4 oz. Bottles (Troy), at 2/9 and 10/6, also in Packets for transmission by Post. W. HOOPER & CO., 24, Russell Street, Covent Garden.

THE ORIGINAL
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CORN AND BUNION PLASTERS,
INVENTED AND ESTABLISHED BY
HENRY YOUNG,
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SUPPLIED BY ALL WHOLESALE HOUSES.
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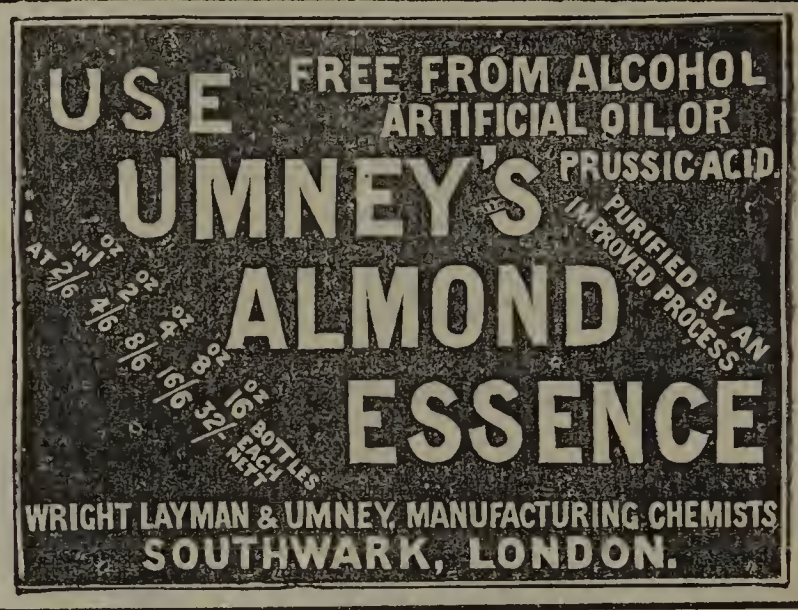

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176 & 177,
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Lavender Water.
In Bottles, from 1/ to 6/ ; in Cases, from 3/ to 15/6.
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THE PHARMACEUTICAL JOURNAL & TRANSACTIONS
HAS A
Guaranteed Circulation of 7000 Copies Weekly.
(The LARGEST Issue of any Journal addressing Chemists and Druggists.)

Terms for Advertisements may be obtained of the Publishers,
J. & A. CHURCHILL, 11, NEW BURLINGTON STREET, LONDON, W.

Those for Businesses, Assistants, Engagements, &c., will be found on page XIX.

ROSE'S LIME JUICE CORDIAL

The Favourite Summer Beverage; wholesome and refreshing. A Delicious Cooling Drink— Effectually Quenching Thirst.

ROSE's LIME JUICE CORDIAL.
Prepared from the Lime Fruit. Is entirely Free of Alcohol. A Wholesome Family Beverage for Dinner or Supper Table.

ROSE's LIME JUICE CORDIAL.
A Delicious Drink in Water— Effervescing in all Aerated Waters. An excellent Stimulant blended with Spirits.

ROSE's LIME JUICE CORDIAL.
The Perfection of Fruit Beverages. Delicious, Cooling and Refreshing in Water— Effervescing in all the Mineral Waters

ROSE's LIME JUICE CORDIAL.
The Favourite Beverage for Lunch, Dinner or Supper Parties. Eminently Wholesome. No table should be without it.

ROSE's LIME JUICE CORDIAL.
A Real Summer Delicacy. Cooling and Refreshing in Water. Effervescing in all Aerated Waters. Effectually Quenching Thirst.

ROSE's LIME JUICE CORDIAL.
The favourite Temperance Beverage; Delicious, Cooling and Refreshing. Entirely Free of Alcohol. Eminently Wholesome.

ROSE's LIME JUICE CORDIAL.
An excellent Substitute for the Lemon as a flavouring in Summer Drinks, Claret Cups, &c. Cooling and Refreshing.

ROSE's LIME JUICE CORDIAL.
Is highly Medicinal, Cooling and Purifying the Blood. An excellent Stomachic, Assisting Digestion.

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No Beverage has received higher recommendations from the Medical Profession as eminently wholesome.—See *Lancet*.

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The Family Dinner Table has additional attractions when supplied with Rose's Lime Juice Cordial in water.

ROSE's LIME JUICE CORDIAL.
Non-Alcoholic. It has now become the favourite Beverage all the year round.

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Sold everywhere. As a protection against imitations, Purchasers should order "ROSE'S LIME JUICE CORDIAL."

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10 & 11, MINCING LANE, LONDON, E.C.

SPECIALITIES: Glycerine—Gum Arabic—Gum Tragacanth—Pure Beeswax—Gelatine—Glucose

PETROLEUM JELLY,

EQUAL TO AND CHEAPER THAN VASELINE.

SANITARY FLUID AND SHEEP DIP,

THE CHEAPEST AND BEST DISINFECTANT.

Grease, Pitch, Asphalte, and all products of Tar and Rosin.

Samples and Prices on application.

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(COX'S PATENT.)

Dated and Sealed April 13, 1854.

Chemists selling TASTELESS PILLS *have an advantage over others neglecting to do so.*

We strongly recommend our Aperient Pills at 6s. and Compound Rhubarb at 7s. per pound, coated, as saleable Pills. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. in the Shilling will be allowed if Stamps or P.O.O. are remitted with order.

Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

The Registrar of Trade Marks (after giving the usual public notice prescribed by Parliament to allow of opposition) has granted us the above "Trade Mark," thus officially recognising us as the "ORIGINAL MAKERS OF TASTELESS PILLS," and no pills will be sent out without this mark on all bottles or packages.

Any Formulæ Dispensed, Covered, and Estimates given.

Samples, with a list of pills from upwards of 500 different forms which are kept in stock, will be forwarded free on application.

ARTHUR H. COX & CO. *Tasteless Pill Manufacturers,* **Brighton.**

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LONDON DEPOT: 7, SNOW HILL.

THE PERFECT SURGICAL BANDAGE

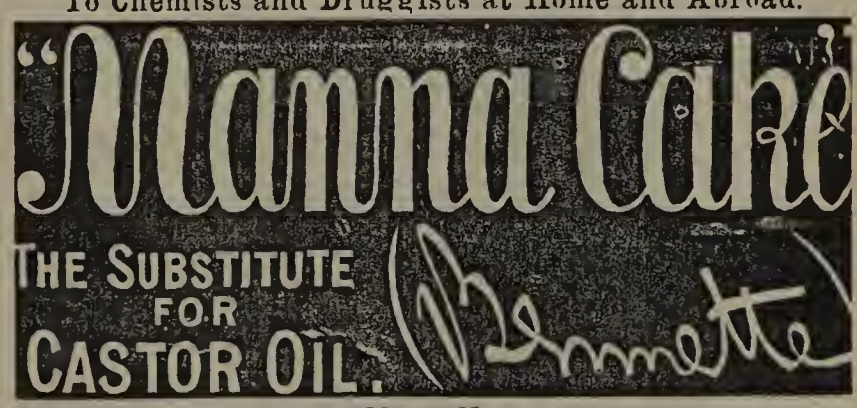
Preferred to all Makes hitherto used.

In Cases of Twelve Six Yard Rolls, 2 inches wide, 3s. 9d.; 2½ inch, 4s. 6d.; 3 inch, 5s. 6d.; or, case containing twelve six yard rolls of each width, 13s.

Free by post, to any address in the United Kingdom, for prepaid orders only. Manufactured by

The BOLE HALL MILL CO., Tamworth, Staffordshire.

To Chemists and Druggists at Home and Abroad.



TRADE MARK, No. 22,133.

Approved of by adults; children take it readily; invalids find it a boon; most suitable for females; **recommended by the faculty.**

Price 1½d. per Cake: 12 *for* 1s. 3d.; *or, post free,* 12 *for* 1s. 6d.; 36 *for* 4s.; *Wholesale to the trade,* 12s. *per gross.*

BENNETTE & Co., Manufacturers, 62, Dale St., Liverpool

St. Thomas's Hospital Medical School,

ALBERT EMBANKMENT, LONDON, S.E.

The WINTER SESSION of 1884-5 will commence on OCTOBER 1st, when an Introductory Address will be delivered by Sir J. Risdon Bennett, M.D., F.R.S., at 3 p.m.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle.

W. M. ORD, Dean.

UNIVERSITY OF GLASGOW.

SESSION 1884-5.

The Medical Session will be opened with an Introductory Discourse by Professor LEISHMAN, M.D., on Tuesday, the 28th October, 1884.

WINTER COURSES.

Zoology, 9 a.m.—Professor Young.
Clinical Medicine, 9 a.m.—Professor M'Call Anderson and Professor Gairdner.
Clinical Surgery, 9 a.m.—Professor George Buchanan and Professor Macleod.
Chemistry, 10 a.m.; and Chemical Laboratory, 10 a.m. to 4 p.m.—Professor Ferguson.
Anatomy: Senior, 11 a.m.; Junior, 2 p.m.; and Practical Anatomy, 9 a.m. to 4 p.m.—Professor Cleland, J. Yule Mackay, M.B., and other Demonstrators.
Practice of Physic, 11 a.m.—Professor Gairdner.
Materia Medica, 12 noon, and Pharmaceutical Laboratory—Professor Charteris and Dr. Napier.
Institutes of Medicine, 12 noon, and Physiological Laboratory—Professor M'Kendrick, and J. M'Gregor Robertson, M.A., M.B., the Muirhead Demonstrator.
Surgery, 1 p.m.—Professor Macleod.
Midwifery, 2 p.m.—Professor Leishman.
Public Health.—Professor Simpson.

SUMMER SESSION.

During the Summer Session the Courses of Botany (Professor Bailey Balfour), Practical Chemistry, Forensic Medicine (Professor Simpson) and Clinical Medicine and Clinical Surgery are given. There are also Courses of Anatomy (Lectures on Embryology), Practical Anatomy, Zoology, Practical Zoology, Vegetable Histology, and Practical Botany, Practical Physiology (including Histology), Practical Materia Medica, Practice of Physic, Practical Pathological Histology, Operative Surgery, and Diseases of Women.

LECTURERS.—Pathology—The Courses of the Pathologist of the Western Infirmary, Dr. Joseph Coats, and of the Pathologist of the Royal Infirmary are recognised.
Diseases of the Eye—Thomas Reid, M.D., Waltonian Lecturer (Summer Course).
Insanity.—Dr. David Yellowlees, Royal Asylum, Gartnavel (Summer Course).

WESTERN INFIRMARY.—This Hospital, near the University, contains 400 beds for Medical and Surgical patients, also Wards for Skin Diseases, and one for Diseases peculiar to Females.

DEGREES.—Three Medical Degrees are conferred, viz.: Bachelor of Medicine (M.B.) and Master of Surgery (C.M.), which must be taken together, and Doctor of Medicine (M.D.); all of which are recognised by the Medical Act as qualifying for practice throughout the British dominions.

COST OF EDUCATION.—The Fee for each class is £3 3s., and the total minimum expenses for classes, hospital, and graduation fees for M.B. and C.M. amount to about £90. The fee for M.D. is £15 8s.

BURSARIES.—Bursaries to the annual amount of about £1000 may be held by Students during their medical studies.

Full particulars connected with the course of education and examination required for the Degrees, and the Preliminary Examination required to be passed by Students before beginning medical study, will be found in the University Calendar (by post 4s.); or a syllabus of the regulations, fees, &c., may be obtained by applying to Mr. Moir, Assistant Clerk of Senate.

The London Hospital and Medical COLLEGE.

HOSPITAL STAFF.

Consulting Physicians—Dr. Herbert Davies, Dr. Ramskill.
Consulting Surgeons—Mr. Curling, F.R.S., Mr. Jonathan Hutchinson, F.R.S.
Physicians—Sir Andrew Clark, Bart., Dr. Langdon Down, Dr. Hughlings Jackson, F.R.S., Dr. Sutton, Dr. Fenwick, Dr. Stephen Mackenzie, Dr. Sansom, Dr. Charlewood Turner.
Assistant Physicians—Dr. Gilbart-Smith, Dr. Warner, Dr. Ralfe.
Surgeons—Mr. Couper, Mr. Rivington, Mr. Jas. Adams, Mr. Waren Tay, Mr. McCarthy.
Assistant-Surgeons—Mr. Reeves, Mr. Frederick Treves, Mr. C. Mansell Moullin, Mr. Hurry Fenwick.
Obstetric Physician—Dr. Herman.
Ophthalmic Surgeons—Mr. Jas. Adams, Mr. Waren Tay.
Physician to the Skin Department—Dr. Stephen Mackenzie
Aural Surgeons—Dr. Edwd. Woakes, Mr. T. Mark Hovel.
Surgeon-Dentist—Mr. Barrett.

LECTURERS

Medicine—Dr. Stephen Mackenzie.
Surgery—Mr. Rivington.
Operative Surgery—Mr. Rivington.
Practical Surgery—Mr. Reeves.
Anatomy—Mr. Frederick Treves.
Practical Anatomy—Mr. Mansell Moullin.
Physiology and Practical Histology—Mr. McCarthy.
Chemistry—Dr. C. Meymott Tidy.
Chemical Physics—Mr. F. J. M. Page.
Comparative Anatomy—Mr. C. Mansell Moullin.
Pathology—Dr. Sutton.
Midwifery—Dr. Herman.
Toxicology—Dr. C. Meymott Tidy.
Botany—Dr. F. Warner.
Medical Jurisprudence—Dr. Sansom.
Practical Chemistry—Mr. F. J. M. Page.
Materia Medica—Dr. Prosser James.
Diseases of the Eye—Mr. Jas. Adams.
Diseases of the Throat—Dr. Morell Mackenzie.
Diseases of the Ear—Dr. Edwd. Woakes.
Anatomy and Pathology of the Teeth—Mr. Barrett.

As Emeritus Professor of Surgery, Mr. HUTCHINSON will give in the Winter and Summer Sessions short Courses of Lectures in Clinical Surgery, consisting of Six Lectures each. The Special Subjects and the dates will be announced in due course.

The SESSION 1884-85 will commence on Wednesday, October 1st, 1884. The Prizes for the past Session and the Nursing Probationer's Prizes will be distributed by the Right Honourable the Lord Mayor, M.P., at 8 p.m., accompanied by the Lady Mayoress; after which there will be a Conversazione, to which all past and present students are invited.

Fee for Lectures and Hospital Practice, ninety guineas in one sum, or 100 guineas by three instalments.

The Hospital contains nearly 800 beds. Number of in-patients during 1883 was 7,976, out-patients 64,256.

THE RESIDENT AND OTHER HOSPITAL APPOINTMENTS are free to full students. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, and one Accoucheurship. Two Dressers and two Maternity Assistants also reside in the Hospital. The holders of all the Resident Appointments are provided with rooms and board entirely free of expense.

TWO ENTRANCE SCIENCE SCHOLARSHIPS, value £60 and £40, and TWO BUXTON SCHOLARSHIPS, value £30 and £20, will be offered for competition at the end of September to new students.

The Letheby Prize, value £30, for proficiency in Chemistry.

A Scholarship, value £20, in Human Anatomy and Physiology, to first year's students.

A Scholarship, value £25, in Anatomy, Physiology and Chemistry, to second year's students.

A Scholarship, value £20, in Clinical Medicine.

A Scholarship, value £20, in Clinical Surgery.

A Scholarship, value £20, in Clinical Obstetrics.

A Duckworth Nelson Prize, value £10 (biennial), in Clinical Medicine and Surgery.

The Hutchinson Prize, value £35 (triennial), in Clinical Surgery.

Prizes, value £60, to Dressers of Out-Patients in Minor Surgery.

Special entries for medical and surgical practice are made.

The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, District, East London, and South-Eastern Railways have stations within a minute's walk of the Hospital and College.

For prospectus and particulars apply personally or by letter to

Mile End, E. MUNRO SCOTT, Warden.

OWENS COLLEGE, MANCHESTER.

Prospectuses of the Pharmaceutical Courses in the Session 1884-5 will be forwarded on application.

J. HOLME NICHOLSON, Registrar.

THE UNIVERSAL
Postal System of Instruction

Has been established for the express purpose of preparing for the various examinations of the Pharmaceutical Society students residing in the country, or those unable to attend a School of Pharmacy.

Pharmaceutical Preliminary	**Fee**	**10s. 6d.**
Pharmaceutical Minor	**Fee £1**	**1s. 0d.**
Pharmaceutical Major	**Fee £1**	**1s. 0d.**
Medical Preliminary	**Fee £1**	**1s. 0d.**

TESTIMONIAL.

BUCKLEY HOUSE, LLANDUDNO,
March 10th, 1884.

GENTLEMEN,

Your excellent system of College training and valuable Postal Lectures have gained a well deserved repute, yet I gladly testify to the entire satisfaction I have felt in going through both one and the other.

Your course of teaching is so thorough, and your efforts to assist and wisely direct every student so unremitting, as to call for the highest praise.

I am, Gentlemen,
Yours very truly,
M. A. S.

The original of this and numerous other Testimonials may be seen at the Office.

For full particulars apply to Messrs. WILLS & WOOTTON, Trinity Square, London, S.E.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 47 out of 51 Pupils passed the last Examinations.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

FOURTEENTH SESSION, 1883-4.

Entries now begun for the term commencing Sept. next.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

PRELIMINARY EXAM. NO PASS, NO PAY.

STUDENTS who really desire to be thoroughly and carefully prepared, so as to ENSURE SUCCESS, should study under the **NO PASS, NO PAY, POSTAL SYSTEM.** For particulars enclose stamped envelope to TUTOR, care of Mr. Filtness, Rotherfield. Reference to pupils who passed the last examination. Metric System Notes, 1s. The inflexions of each word in Cæsar, 1s.

FOR TERMS FOR ADVERTISEMENTS, SEE PAGE XIX.

THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

At the Examinations held in London this month, 5 Major candidates from this School presented themselves. The following 4 passed:—

Mr. CLOWER	Mr. HANSON
,, GRADIDGE	,, SALMON

17 Minor candidates were recommended to present themselves for examination. The following 13 passed:—

Mr. ADAMS	Mr. GRAY
,, ASTON	,, JAMES
,, BAYLEY	,, JOINT
,, GIBBONS	,, HUGHES
,, FISHER	,, STEVENS
,, FLOWER	,, TIMM

Mr. WATSON

LIVERPOOL SCHOOL OF PHARMACY.

36, Oxford Street, Liverpool.

Principal: J. S. WARD, Ph. Ch., M.P.S.

(*Prize Medallist and South Kensington Prizeman.*)

The next session will commence on Monday, September 1st, with Two Courses of Lectures, one for the October candidates, and the other a full course extending over until the December Examination.

Three out of Four of those who have passed from this School at the recent Examinations have been successful on their first attempt.

A new Prospectus, with full particulars of the School premises, curriculum, fees and testimonials, will be forwarded on application.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS
(*From the Royal School of Mines*),
6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.

As each Student is taught and works *separately*, entry may be made at any time. Individual personal attention. No Demonstrators. Postal teaching. Enclose stamp for terms, &c.

LABORATORY CLOSE TO GOWER STREET STATION.

PHARMACEUTICAL PRELIMINARY, LONDON MATRICULATION, AND ALL MEDICAL PRELIMINARIES.

RAPID and thorough preparation, privately and in class. Postal Tuition for these Examinations and Bell Scholarship. For particulars, enclose stamp, Mr. A. DAWES, 1st B.A. Lond., Adderstone, Vardens Rd., New Wandsworth, S.W. (close to Clapham Junction Station.)

WESTMINSTER COLLEGE

TRINITY SQUARE, BOROUGH, LONDON, S.E.

The next Session will commence on Monday, September 1st.

FEES:—

To the October Examination	...	£5 5s.
To the December ,,	... ...	£8 8s.
Six Months' Course ...	... ...	£10 10s.
Twelve Months' Course	... ...	£15 15s.

At the Pharmaceutical Examinations held last month, the following 29 Students of the Westminster College were successful in passing the MINOR Examination:—

*Mr. A. BANKS
* ,, W. BARKER
* ,, T. N. BROOKE
,, B. H. BUTLER
,, W. CLARKE
,, C. ELLIS
,, H. C. GLANVILLE
,, W. H. GODSLAND
* ,, E. E. HALL
,, J. H. HOPPER
,, A. J. HEMSTEAD
* ,, J. HULLAND
* ,, S. HUGGINS
* ,, G. JACQUES
* ,, J. K. JONES
Mr. R. M. LEWIS
* ,, C. O. MORRISON
,, G. MOOR
,, G. NEALE
,, J. NEWTON
,, F. ROOKLEDGE
,, F. T. SANDERS
,, B. SMITH
,, J. STURDY
* ,, W. SUMNER
,, T. E. TAYLOR
,, A. WALDRON,
,, H. P. WITHERS
,, H. E. YOUNG

PRELIMINARY.

*Mr. R. COLWILL | *Mr. N. COUVE
Mr. A. T. RILEY.

* Resident Students.

GOLD MEDAL.

At the Examination held on July 21st, Mr. WALTER JACKSON, of Marlborough House, Seaham Harbour, was awarded the GOLD MEDAL of the College.

EVENING LECTURES,

Laboratory Instruction and Classes.

Gentlemen engaged during the day, and unable to leave business, may be prepared for the Pharmaceutical Examinations in the evening.

HOURS OF ATTENDANCE.

Minor ... ... Tuesday and Thursday, 7 till 9 p.m.
Preliminary... ... Friday, 7 till 9 p.m.

Preliminary Students may enter the class at once.

"*We have visited the Westminster College of Chemistry and Pharmacy, and with the facilities* Mr. WILLS *has at command, we can scarcely wonder that the whole of his Students pass without difficulty.*"—Magazine of Chemistry and Pharmacy.

For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON.

CONCILIO ET LABORE.

THE MANCHESTER COLLEGE OF CHEMISTRY & PHARMACY

225, OXFORD STREET, MANCHESTER.

DIRECTOR:
Mr. W. SPENCER TURNER, Pharm. Chemist, &c.

Report of Classes and Notice of Proposed Arrangements.

In the last five Examinations held in London and in Edinburgh, viz.: January, February, April, June, and July, **FOURTEEN** Students from this School passed the Minor, and **TWO** passed the Preliminary, viz.:—

MINOR.

EDINBURGH, JANUARY.—Four, *viz.*:—
Mr. C. CAMPBELL, Manchester.
,, A. E. H. BLACKBURN, Eccles.
,, J. H. MORRIS, Bolton.
,, D. PATTERSON, Bolton.
Three of these were "Afternoon Class" Students.
(One passed in DECEMBER, 1883, viz.:—
Mr. J. TALLANTYRE, Manchester.)

LONDON, FEBRUARY.—Two, *viz.*:—
Mr. W. DUCKWORTH, Blackburn.
,, F. JACKSON, Manchester.
(One passed at Apothecaries' Hall, viz.:—
Mr. D. H. OXEN, Tynemouth.)

LONDON & EDINBURGH, APRIL.—Four, *viz.*:
Mr. W. ASPINALL, Platt Bridge.
,, E. S. BARLOW, Oldham.
,, F. RIDDIOUGH, Leeds.
,, ALBERT SMITH, Stalybridge.

LONDON, JUNE.—One, *viz.*:—
Mr. F. A. ASTLEY, St. Anne's-on-Sea.

LONDON & EDINBURGH, JULY.—Three, *viz.*:
Mr. T. E. BARRASS, Peterborough.
,, R. KNOWLES, Darwen.
,, J. G. ROWELL, Leeds.

PRELIMINARY

APRIL.—Mr. T. E. GREENHALGH, Blackpool.
JULY.—Mr. W. R. TURNER, Stockport.

The next Session will begin on

MONDAY, AUGUST 18th,

When the undermentioned sets of Classes will be conducted by Mr. TURNER and his Assistants.

A. Afternoon and Evening Classes for the **PRELIMINARY.**

B. Day, Afternoon, and Evening Classes for the **MINOR.**

C. Day and Evening Classes for the **MAJOR.**

Full particulars of all these Classes are given in the new Copyright Prospectus, which is now ready for distribution.

TERMS FOR ADVERTISEMENTS
IN THE
PHARMACEUTICAL JOURNAL.
GUARANTEED CIRCULATION
7000 Copies Weekly.

Assistants Wanted, Apprenticeships Wanted, Businesses for Disposal, Wanted to Purchase, also Advertisements of a general character (in column).—Seven lines (50 words) or less, 4*s.* 6*d.* Each line (seven words) extra, 6*d.*

Special terms for **Assistants seeking Engagements** *only.*—Four lines (28 words) or less, 2*s.* 6*d.* Each line (seven words) extra, 6d.

Postage stamps *cannot be received*, but payment may be made either by **Cash** in a Registered Letter, or by **Cheque** crossed London and County Bank, by **Postal Order**, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL.

Advertisers are requested to observe :—

1.—That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.
2.—That letters addressed to initials or to fictitious names at a Post Office are not taken in, but are at once sent back to the writers by the Post Office Authorities.
3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers.

Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

J. & A. CHURCHILL, 11, New Burlington St., London, W.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, Gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium, 100 Plants, 5s.

ENGAGEMENTS WANTED.

TRAVELLER (disengaged) requires a situation as such in a Wholesale Drug House. 10 years' experience amongst Chemists. C. SMITH, 50, Hurley Rd., London, S.E.

AS Improving ASSISTANT, with little studying time. Ætat. 25. 2½ years' assisting Surgeon's Dispensing, &c. 12 months' Retail. Good references. Disengaged Aug. 30. CHEMICUS, West Hill Pharmacy, Hastings.

LOCUM TENENS, MANAGER or SENIOR. Qualified. Age 27. Disengaged. Good appearance and address. Extensive experience. Undeniable references. R. E. W., Easthorpe, Kelvedon, Essex.

QUALIFIED and Registered gentleman, disengaged, would undertake Management of Branch or other place of trust. Has had great experience and had sole charge. ASSOCIATE, 31, Edgware Rd., W.

ENGAGEMENTS WANTED.

AS LOCUM TENENS or MANAGER, by a Pharm. Chemist, with first-class experience and highest references. BETA, care of Mr. Burke, William St., Windsor.

AS MANAGER, or position of trust.—Many years' high class West-end experience. Disengaged. A. B., Mr. Howdon, 78, Gracechurch St.

LOCUM TENENS or TEMPORARY until the end of the month, by a young man, age 23. Disengaged. London experience. ALPHA, Miss Evans, 7, Ropemaker St., Finsbury Sq., E.C.

FOR three months.—As ASSISTANT, in a first-class Dispensing business. 6 years' experience. B., W. Baxter, Esq., 325, Kennington Rd., S.E.

APPRENTICE.—A Pharm. Chemist wishes to place his son in a good country business, within moderate distance of London, where he would have an opportunity of instruction under the principal's superintendence. Terms and particulars to S. G., care of Hodgkinsons & Co., Whitecross St., London.

WHOLESALE.—Advertiser seeks re-engagement in the above. First-class London experience and references. Age 28. Disengaged. CHEMICUS, C. Steele, Esq., Ludgate Arcade, E.C.

ASSISTANT, age 33, requiring more experience, improvement in Dispensing, wants to meet with a comfortable home. Good references. Moderate salary. CROCI STIGMAT, 15, Sewerby St., Moss Side, Manchester.

DISENGAGED from 6 p.m., and 2 p.m. Saturdays. Varied experience. Can Prescribe and Extract Teeth; also good Bookkeeper. X., Mr. Dubbin, 1, Ion Rd., Bensham Manor Rd., Thornton Heath.

AS JUNIOR. Ætat. 18. Height 5ft. 9in. 18 months' Homœopathic experience. Abstainer. State hours, &c., to T. WILLEY, Mr. Darling, 126, Oxford St., Manchester.

AS JUNIOR. Age 21. With time for study. London preferred. Can assist at Dentistry. G. S., 29, Penn St., St. Paul's, Bristol.

IMMEDIATELY.—As MANAGER or DISPENSER in good house by a qualified Assistant (Minor). Good experience. Age 26. London preferred. A.P.S., 6, St. Stephen's Ter., Albert Sq., S.W.

AS ASSISTANT or MANAGER of Branch. Out-door. About beginning of September. In or near Manchester. Age 26. Height 5ft. 10in. Prescribe and Extract Teeth. E. A. W., 2, London Rd., Enfield.

MANAGER for widow lady, or LOCUM TENENS. First-class experience and reference. Disengaged on 15th inst. D. 35, Messrs. Evans, Lescher & Co.

AS JUNIOR. In London or suburbs. Age 23. London experience. CHEMICUS, 11A, Kensington Sq., W.

AS Temporary MANAGER or ASSISTANT. Qualified. Aged 31. Town or country. Disengaged. C. M., 9, Devonshire Ter., Notting Hill Gate, W.

LOCUM TENENS.—Day, week or month. Town and country experience. Minor qualification. Disengaged August 15. Good references and moderate terms. A. P. S., 34, Bridge St., Cambridge.

FOR a fortnight or more.—A gentleman desires an engagement during holiday. Good Dispenser and Bookkeeper. Minor qualification. Excellent references. Disengaged August 16th. CHEMICUS, 2, Mall Rd., Hammersmith.

AS SENIOR or MANAGER. Temporary or otherwise. Age 28. Qualified. Height 5ft. 8½in. CORTEX, 53, Panton St., Cambridge.

AS Temporary MANAGER. Age 30. Thorough experience. Disengaged from 9th to 15th, and from 28th. Terms 6s. per day. Abstainer. CHEMICUS, 2, Myrtle Cottages, Hoe St., Walthamstow, E.

ENGAGEMENTS WANTED.

AS ASSISTANT, with view to ultimate purchase of business.—Qualified, and considerable Dispensing experience. Letters will be treated in confidenee. A. W., care of Messrs. Fletcher & Son, Norwich.

AS TRAVELLER for Wholesale Drug House or Manufacturing Confectioners. 8 years in Retail, also taken occasional journeys. Age 25. Good address. Highest references. Small salary at first. A., Mrs. Stainsby, High St., Yarm, Yorkshire.

AS SENIOR or MANAGER. Out-door. Age 27. Qualified. 12 years' experience. Good references. W. H. DAWSON, Phœnix House, Spilsby, Lincolnshire.

AS SENIOR. Over 11 years' good experience (West-end and provincial). Minor qualification. Disengaged 11th inst. Please state salary, &c. W., 29, Newcastle St., London, W.C.

LOCUM TENENS.—In consequence of unforseen circumstances, Mr. W. B. WEST is disengaged from August 22 till August 30. 6, Acre Lane, S.W.

AS JUNIOR.—London preferred. Age 23. Height 5ft. 10in. E. G., 92, Kirkdale, Sydenham.

AS MANAGER, DISPENSER, SENIOR, or position of trust.—Registered. 20 years' experience. Age 35. Single. Wesleyan. Can Extract Teeth. Now disengaged. CHEMICUS, Mr. Morris, Newland Villa, Pelsall, Walsall.

MANAGER, or for Branch. Age 33. Qualified. Single. Accustomed to Dispensing, Prescribing, Teeth Extracting, and Family Retail. Suburbs or provinces preferred. STATIM, 78, Wells St., Oxford St., London, W.

ASSISTANTS WANTED.

ASSISTANT, for a good class country business. Must be energetic, of good address, and obliging. Salary £50, in-doors. State height, age and usual particulars, enclosing carte. Also a vacancy for an APPRENTICE. Address, EDWARD BARNES, Chemist and Dentist, High St., Godalming, Surrey.

TRAVELLER.—An experienced TRAVELLER, to represent a firm of Wholesale Druggists and Manufacturing Chemists in Transatlantic Countries. Apply, by letter only, to W., 22, Westbourne St., Hyde Park. All communications will be treated as confidential.

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AN out-door ASSISTANT, well up in Dispensing, and a good Counterhand. Apply, giving full reference, enclosing carte de visite, and stating salary expected, to GOULDING'S, Cork.

AS MANAGER of a BRANCH. 24 to 30 years of age. Single. Preference for one who can Extract Teeth and give a personal interview (before 11 or after 6), otherwise forward photo, height, age, with whom last and how long, salary expected, to G. MORRIS, Chemist, Green Lanes, Highbury New Park, London, N.

A PERMANENCY.—An active competent ASSISTANT, about 25, for a good Dispensing and general Retail. Apply or write, CROSBY & Co., 112, St. John's Hill, Wandsworth, S.W. Minor preferred.

ASSISTANTS WANTED.

APPRENTICE.—ROBERT KEEVILL, Pharmaceutical Chemist, 8, York Bldgs., Clifton, Bristol, has a vacancy for a well-educated gentlemanly youth. A comfortable home, and every facility for acquiring a thorough knowledge of the business, with liberty to attend lectures at the University College.

APPRENTICE.—H. J. BROUGH, Pharmaceutical Chemist, has a vacancy for a respectable youth as in-door APPRENTICE. Thorough personal instruction, and every home comfort. Premium required. 7, Netherwood Rd., West Kensington Park, W.

APPRENTICE.—A vacancy occurs for a gentlemanly well educated youth to thoroughly learn every branch of the business. Time allowed for attending lectures, recreation, &c. References to former pupils. Within 10 minutes' walk of Wills' College. Moderate premium required. Address, J. E., 74, Deacon St., Walworth Rd., London, S.E.

AN APPRENTICE, IMPROVER, or good JUNIOR, in the principal Pharmacy at Lowestoft. A comfortable home and excellent opportunities for studying the profession thoroughly. Address, M.P.S., 1, Pier Ter., Lowestoft.

APPRENTICE.—A respectable well educated youth as APPRENTICE. For terms apply to T. MARSHALL, Chemist, Beverley, Yorks.

APPRENTICE.—P. SMITH & Co., Chemists and Dental Surgeons, Runcorn (established nearly a century), require a respectable well educated youth as in-door PUPIL. Premium moderate. Comfortable home, and every opportunity for learning the business.

BY the end of August.—An IMPROVER, or a genteel youth, who has passed his Preliminary exam., would be taken on favourable terms, as an APPRENTICE. Address, W. H. BULLEY, Dispensing Chemist, 26, High St., Exeter.

ABOUT the 20th.—For a high-class Family business, an in-door ASSISTANT not less than 22 years old. Applicants should state full particulars, including height, salary demanded, and references. Must have gentlemanly manners and be active and obliging. Also vacancy for an APPRENTICE. GORDELIER, Chemist, Sittingbourne, Kent.

IMMEDIATELY.—ASSISTANT, accustomed to general Drug trade and Dispensing. State full particulars as to age, salary, and experience, with reference, to W. ALCOCK, Broomhall St., Sheffield.

AN experienced ASSISTANT. Can wait a short time. Apply personally to BUTLER & CRISPE, Chemists, 4, Cheapside, corner St. Paul's, London.

AS JUNIOR or TEMPORARY for 2 or 3 weeks. HENRY S. JONES, Ph. Chemist, 139, Fulham Rd., South Kensington.

WAREHOUSEMAN or HEAD COUNTERMAN, accustomed to the Wholesale Drug trade. Apply by letter, stating age, salary and experience, to X. Y. Z., care of Mr. C. R. Brown, 40, Sun St., Finsbury, E.C.

JUNIOR ASSISTANT.—Apply stating age, height, salary expected, references, with usual particulars (enclosing carte) to be returned, to W. F. NEWMAN, Pharmaceutical Chemist, 8, Market St., Falmouth.

AN ASSISTANT, for a country business. Out-door. Undeniable references required. Please state age, height, salary (out-door), when disengaged, together with testimonials from last employer, to E. G. CARRINGTON, Chemist, Bakewell.

J. R. SUMMERS, Pharmaceutical Chemist, 15, Norton Folgate, London, E., will require by the 18th inst. a respectable and energetic ASSISTANT. Age 22 or 23. If application by letter, please send height and photo.

ASSISTANTS WANTED.

AN ASSISTANT between 21 and 25. Must be a good Counterman and have a fair knowledge of Dispensing. Send carte. HUGHES & WYATT, Stourbridge.

BY the 28th August. An ASSISTANT for light Retail and Hospital Dispensing. Minor qualification essential. Apply, stating full particulars to F. WHEELER, Chemist, Guildford.

G. T. W. NEWSHOLM, Pharmaceutical Chemist, Sheffield, has a vacancy for an IMPROVER or TURNOVER APPRENTICE, must have passed Preliminary. State experience, also salary required, out-door.

SENIOR for Ireland, at once.—A gentlemanly ASSISTANT as first Counterman, to undertake the duties of the Retail department and superintend those under him. Would have to take his turn periodically in the Dispensing department. Apply, by letter, enclosing photo. if possible, stating experience, references, and salary required, to VIGILANS, care of F. Newbery & Sons, 1, King Edward St., London, E.C.

AN ASSISTANT for a first-class Retail and Dispensing business. In-door. Two Assistants kept. Short hours. State full particulars as to height, salary, age (not under 22), when disengaged; enclose carte (to be returned). C. J., care of Messrs. Herrings, 40, Aldersgate St., London.

IMMEDIATELY.—An expericnced in-door qualified ASSISTANT, who has been accustomed to good country trade. Apply, stating age, salary and references, to CHEMICUS, Ferndale, Pontypridd.

A COMPETENT ASSISTANT, about 22, in-door, who who has been accustomed to good class country business, and must be able to take sole charge of Dispensing when required. Senior, Apprentice, &c. kept. Churchman preferred. Apply, stating age, height, salary, previous experience and references (enclose carte if convenient), to THOMAS SELLORS, Chemist, Coventry.

COMPETENT ASSISTANT for an old-established and central business. Liberal salary to an obliging and energetic man. In-door. Full particulars to Messrs. BANKS & Co., Birmingham.

TWO ASSISTANTS, in-doors, not under 21 and 23, in a light Retail and Dispensing business. Light Sunday duty, and 12 hours off every week. State age, height, salary and all previous engagements, with carte, to be returned, or apply to D. THOMSON, Pharmaceutical Chemist, 137, Queen's Cres., Haverstock Hill, London.

IMMEDIATELY.—Junior ASSISTANT or IMPROVER, of steady business habits, for a Mixed country business. Apply, stating age, &c., to D. JENKINS, Chemist, Bridgend.

AN ASSISTANT, age about 22, for general Retail and Pre-cribing trade. H. R. ADAMS, High St. and Harbour St., Whitstable.

ABOUT September 1st.—An ASSISTANT, with Minor qualification, to take almost the entire Management of a suburban business, where the principal does not reside on the premises. Salary £80, to board himself, but attendance found. Unexceptionable references required. E. JEFFRIES, Chemist, Peckham Rye.

IMMEDIATELY.—A JUNIOR, who can be well recommended in respect both of sterling character and business ability. Member of a Christian church preferred. Address, W. M. B., 1, Chippenham Pl., Malvern Rd., Kilburn.

DISPENSER.—Midland Counties town. At once, by a medical practitioner (private surgery), a neat and accurate DISPENSER. No bookkeeping. Hours from 9 to 9, with two hours off duty. Saturday and Sunday afternoon free. Salary to commence at £80. Out-door. Apply to WYMAN & WESTWOOD, 25, Charles St., Farringdon Rd., London.

ASSISTANTS WANTED.

FOR September 6.—An ASSISTANT in a high class Dispensing business. Also an IMPROVER. State full particulars to J. V. TOONE (formerly Steele & Smith), 14, New Bond St., Bath.

ASSISTANT for 2 or 3 weeks from third week of August. Apply, with references, to Mr. GIBB, Chemist, The Piazza, Winchester.

AT once.—A steady and obliging ASSISTANT, capable of Managing a Branch Country Retail. One seeking a permanency preferred. Must be single and well recommended. State experience, age, and required salary, to R. W. PEACH, Chemist, Donington, near Spalding.

IMMEDIATELY.—Junior ASSISTANT, of good address and appearance, well up in Dispensing and Fancy Retail, and able to take charge occasionally during principals absence. State age, height, salary, with reference and carte, to JOHN LEA, Folkestone.

BUSINESSES FOR DISPOSAL.

BIRMINGHAM.—A genuine Retail and Dispensing BUSINESS, in one of the principal thoroughfares. Returns last year £815. Shop well fitted and stocked. Price £500, or £100 goodwill and stock and fixtures at valuation. Apply, J. B., care of Southall & Barclay, Birmingham.

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WARWICKSHIRE.—In a fashionable town. A genuine Dispensing and Retail BUSINESS. For disposal through ill-health. Every investigation allowed. Shop well fitted. Large and roomy house. Private entrance. Rent £55. One Proprietary Article pays rent. Price £650. Address, CHEMIST, care of Messrs. Southall Bros. & Barclay, Birmingham.

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£200 REWARD.

THE undersigned, the Proprietors of Liebig's Chemical Food or Wine of Phosphates, having reason to believe there is a spurious article on the market, hereby offer a reward of **Two Hundred Pounds** to any person or persons who shall give such information as will lead to the discovery and conviction of anyone making or offering for sale, spurious or forged imitations of their proprietary article. No travellers are employed, and Goods are never given in payment of accounts, consequently no **Liebig's Chemical Food or Wine of Phosphates** can be genuine unless it is obtained in the usual way of business from the wholesale houses. If desired, all communications will be treated as strictly private and confidential. LIEBIG & Co., Proprietors of Liebig's Chemical Food or Wine of Phosphates, 12, York Buildings, Adelphi, London, W.C.

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5. London, N. „ £761. „ £700.
6. London, City. „ £10 per week. Valuation.
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8. London, N.W. „ £650. „ £650. New lease.
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20. Wilts. „ nearly £800. Price £550.

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AND
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TABLE OF CONTENTS.

Page
The Galenical Pharmacy of the New Pharmacopée Francaise (*continued*).. 121

EDITORIAL ARTICLES AND NOTES:—
The British Pharmaceutical Conference 123

PHARMACEUTICAL SOCIETY OF IRELAND:—
Meeting of the Council 128

Page
BRITISH PHARMACEUTICAL CONFERENCE —
Twenty-first Annual Meeting 128
Report of the Executive Committee 129
The President's Address 130
The Financial Statement 131

Page
A Report on English Rhubarb. By William Elborne 136
Analyses of Rhubarb. By William Elborne..... 137
The *Times* on the Conference Meeting and Pharmacopœia Revision..... 140

Pharmaceutical Society of Great Britain.

17, BLOOMSBURY SQUARE, LONDON.
RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

LIBRARY AND MUSEUM
SPECIAL NOTICE.

The Library and Museum will not be open in the evening during August and September.

The Library and Museum will be closed from September 1st to September 13th, both dates inclusive, for revision.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

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There are at present *thirty-nine* annuitants, receiving £1320 per annum, and casual relief is also granted, amounting to nearly £700 per annum, involving a total annual expenditure of upwards of £2000.

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Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

CATALOGUE OF THE MUSEUM.

The Catalogue of the Museum may be obtained from the Secretary, price 2s.; or by post, 2s. 4d. Each Member, Associate, and Apprentice of the Society will be supplied with one copy *gratis*, on application to the Secretary.

NORTH BRITISH BRANCH.

The Society's Rooms at 119A, George Street, Edinburgh, will be closed from and after Saturday, August 16th, and the new premises at 36, York Place, Edinburgh, will be opened on Wednesday, October 1st.

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OF THE

Pharmaceutical Society of Great Britain.

FORTY-THIRD SESSION, 1884—85.

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PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
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Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London, W.C.

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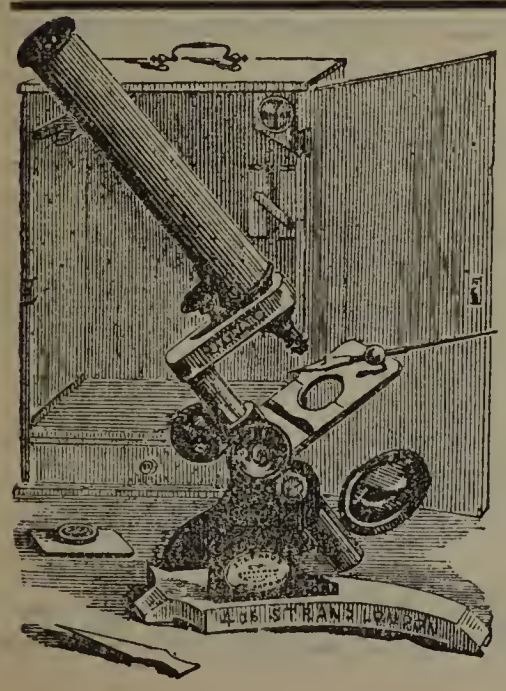

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FERRIS' NEPENTHE.

FERRIS & CO. *v.* GOODMAN.

Notice is hereby given, that by an Order of the Chancery Division of the High Court of Justice, made the 18th day of July, 1884, in the above action, it was ordered that the Defendant and others be perpetually restrained from selling, or offering for sale, any formula or recipe for "Nepenthe," and from otherwise prejudicing the sale thereof by, or injuring the title thereto, or Trade Mark therein, of the Plaintiffs, Messrs. FERRIS & Co., of Bristol, Wholesale Druggists, the Registered Proprietors thereof.

And it was further ordered that the Defendant do pay the costs of the said action.

Dated this 12th day of August, 1884.

(*Signed*) CHILTON & GREEN, ARMYTAGE, BRISTOL.
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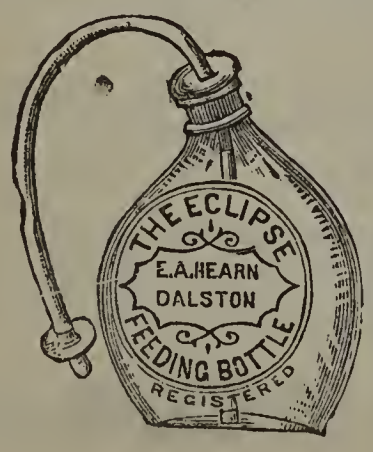

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DOUBLE THE STRENGTH OF ORDINARY SUPER QUALITIES.

W. J. B. & CO. caution the trade against the so-called soluble Essences now so frequently offered for sale, which are nothing more than mere tinctures, and, although offered at lower prices, cost five or six times as much in use, whilst imparting a strong medicated flavour.

The importance of our invention of Soluble Essence is clearly shown by the numerous imitators and copyers that have sprung up, and we must inform the Trade that ours are the only **Genuine Original Soluble Essences.**

FRENCH CREAM GUM EXTRACT.

Protected by Royal Letters Patent. For producing a head of creamy richness upon all kinds of

Syrups, Aërated Waters, Beers, Ales, Cider, &c.

W. J. BUSH & CO. regret having to caution the trade against spurious imitations of this article, most of which being mere rubbish.

W. J. BUSH & CO.'S

ENGLISH DRAWN ESSENTIAL OILS

OL. AMYGD. ESSENT. ANG.
" AMYGD. " (SINE ACID. PRUSSIC)
" ANETHI ANG.
" CARUI ANG.
" CARYOPH. ANG.
" CINNAM. VER. ANG.
" CUBEBÆ ANG.
" COPAIBÆ ANG.
" MYRISTICÆ ANG.
" SANTAL. FLAV. ANG.
" MENTHPIP MITCH. RECT.
" PIMENTA ANG.
" SASSAFRAS ANG
" PATCHOULI ANG.

OL. LIMONIS (*W. J. B. & Co.'s Speciality*).

20-23, ARTILLERY LANE, BISHOPSGATE, LONDON, E.

KANGRA VALLEY
INDIAN TEA GROWERS' ASSOCIATION
11, Panton Street, Haymarket,

LATE 7, NEW COVENTRY STREET, LEICESTER SQUARE, W.

Ths object of the Planters who have formed this Association is to establish a business for the direct supply of Tea from the Plantations of the Kangra Valley to the Public.

The feature of this business is that the Tea is delivered to Customers in the original tin-foil lined parcels in which it is packed by the Natives in the Valley where grown, and is absolutely pure.

There are three qualities, Orange Pekoe, Pekoe, and Pekoe Souchong, retailing respectively at 4s., 3s., and 2s. 6d. per lb. The two former are packed in one lb. and half lb. packets, and the Pekoe Souchong, *which can be particularly recommended as being economical for large households*, in one lb., half lb., and quarter lb. packets.

From the **Medical Times**, *June 7*, 1884.

INTERNATIONAL HEALTH EXHIBITION.—In this number wo commence a series of articles on the food products at the Exhibition, which will differ in some important respects from those appearing in so many weekly and daily journals, more especially in that we accept and reproduce no statement relating to any exhibit without a strict examination, nor do we give any decided opinion save after a chemical and microscopical investigation.

Tea.—Considerable prominence is given to teas cultivated in India. About half a century ago in the virgin forests of Assam, the indigenous Indian tea plant was discovered, and in 1840 the Assam Company was founded, but for several years Indian teas were little known and produced but in small quantities. Their cultivation has, however, been so developed by British capital and British planters, that 240,000 acres of jungle have been cleared in various Indian districts, and the out-turn has grown from a million of pounds in 1864 to 60 millions of pounds in 1883, which is equal to one-third of the whole consumption of the United Kingdom. If this process goes on, a time will come when tea will be wholly and entirely supplied from plants grown within the limits of the Empire, a very desirable consummation.

We have specially examined three samples af tea of the Kangra Valley Association.

Nearly all the analyses of tea published, represent not what the people actually drink, but the amount of matter the chemist can extract. This mode of judging of the quality of tea is essentially erroneous. We have therefore examined these by imitating as far as possible domestic tea-making. A known weight of tea has been infused in London water, at 212° F.; and after standing the usual time, the water has been poured off, and a little more added, and the same process repeated. The infusion has then been made up to a known bulk, and the tannin, theine, extract and ash therein estimated. Examined in this way, a good idea is formed of what is actually consumed, for the amount of tannin, theine, cellulose and mineral matter left in the teapot is of scientific interest only.

1.—Kangra Valley tea, Orange Pekoe, price 4/- per lb. A one per cent. infusion yielded:—

Theine	·029 grm.
Tannin	·144 ,,
Total extract	·28 ,,
Ash	·04 ,,

2.—Kangra Valley tea, Pekoe, price 3/- per lb. A one per cent. infusion yielded:—

Theine	·025 grm.
Tannin	·138 ,,
Total extract	·28 ,,
Ash	·04 ,,

Both these samples are high-class teas, but although there is no less than 1/- per lb. difference in price neither analysis or taste differentiates them in the same degree; the higher priced is a little more astringent and nitrogenous than the lower, but the flavour of the Pekoe was preferred by all the people to whom it was submitted.

3.—The third tea, named Pekoe Souchong, price 2/6, gave when examined in the same way:—

Theine	·016 grm.
Tannin	·090 ,,
Total extract	·22 ,,
Ash	·04 ,,

thus considerably weaker in all constituents extracted by water, *but it has an excellent flavour and is about the best 2/6 tea the writer has ever examined.*

BENGER'S PREPARATIONS.

These Preparations received a FIRST-CLASS AWARD (the Highest Obtainable), at the INTERNATIONAL MEDICAL AND SANITARY EXHIBITION, SOUTH KENSINGTON.

LIQUOR PANCREATICUS (BENGER)—For the Preparation of Peptonised or Artificially Digested Food. Bottles, 2s. 6d., 4s. 6d., and 8s. 6d., with full directions.

LIQUOR PEPTICUS (BENGER)—A Concentrated Fluid Pepsine of great activity. Dose, one to two teaspoonfuls with meals. Bottles, 3s., 5s. 6d., and 10s. 6d.

BENGER'S PEPTONISED BEEF JELLY—May be taken by teaspoonfuls as a quick restorative, or used to fortify ordinary beef-tea, soups, &c. Tins, 2s. each.

BENGER'S SELF-DIGESTIVE FOOD—For Infants and Invalids. When mixed with warm milk, digestion of the whole commences at once. Tins, 1s. 6d. and 2s. 6d.

Of all leading Wholesale and Retail houses.

MANUFACTURERS,

MOTTERSHEAD & CO. Pharmaceutical Chemists,

MANCHESTER.

The Association Pin-point.

Registered.

THE ASSOCIATION for the SUPPLY of PURE VACCINE LYMPH,

3, Hemming's Row, St. Martin's Lane, London, W C.

SOLE AGENTS FOR

Dr. WARLOMONT'S CALF VACCINE.

Tubes, 2s. each; Half Tubes, 1s. each.

Pomade in Vials, 5s. each.

HUMAN VACCINE.—Three Tubes, two-thirds full, 5s.; Tubes one-third full and Lancet Charged Points, 1s. each; Pin-points, 1s. 1d. each. Eighteen Charged Small Points, 5s. Pin-points uncharged, 1s. per dozen.

P.O.O.'s (including postage, and crossed London and Westminster Bank), with orders payable to

EDWARD DARKE, Secretary.

GOLD MEDAL, BOSTON EXHIBITION, 1883.

SIR JAMES MURRAY'S
PURE
FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of

ACIDITY, INDIGESTION, HEARTBURN, GRAVEL & GOUT.

Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

His **FLUID CAMPHOR** is a valuable remedy for Sleeplessness and Weak Nerves.

Bottles, 1s. and 2s. each.

SQUIRE'S
CHEMICAL FOOD

[*Syrup. Ferri Phosph. Comp.* (*Squire*).]

History. This agreeable preparation was originally introduced by the late Professor EDWARD PARRISH, about the middle of the present century; he subsequently much improved his original formula.

In its present perfected form the sole right of manufacture has been acquired by Messrs. SQUIRE, who have for many years acted as Professor PARRISH'S Agents in this country.

Properties. It is a complex solution of IRON, LIME, SODA, and POTASH, in a PHOSPHORIC SYRUP (*containing the Iron in the Ferrous condition*). It thus contains no single substance which is not a constituent of the blood and tissues, and therefore may be administered daily for a lengthened period.

Uses. Physicians have prescribed it for the last twenty years more extensively than any other preparation of the kind. They have found it useful in a great variety of maladies, and especially suitable as an addition to the diet of delicate children, and in all cases of pallor and general weakness in adults as well as children.

N.B.—The Profession are cautioned against unscrupulous persons who copy the wording of our labels and the colour of our cases.

SQUIRE'S
SUPERDIASTASIC
MALT EXTRACT

Extract. Bynes (*Squire*).

This Extract is prepared from the finest Malted Barley, at a very low temperature *in vacuo*, by a special process, under the immediate supervision of one of the firm.

It contains the largest quantity of active diastase, and possesses the highest digestive power of any Extract of Malt in the market.

It is a valuable nutrient, undoubtedly of service in Consumption and other wasting diseases, and, being pleasant and palatable, is a most useful adjunct to the food of children.

It is one of the best remedies for indigestion when taken with **Squire's Pepsine.**

This preparation gained a Silver Medal (the only award for Malt Extract) at the National Health Exhibition, where it was in competition with Malt Extracts of other well-known makers.

Dose—A dessertspoonful for adults; a teaspoonful for children.

SQUIRE'S
MALTED AND COOKED FARINACEOUS
FOOD FOR INFANTS

This will be found one of the most nutritious and easily digested Foods for Infants.
Full directions accompany each tin.

SQUIRE, Chemist on the Establishment in ordinary to the Queen 413, Oxford Street, London

Hunyadí János

CAUTION.—Circumstances which have come to the knowledge of Andreas Saxlehner, Buda Pest, Sole Proprietor of the Hunyadi János Spring, compel him to WARN the British Public against SPURIOUS IMITATIONS. To secure genuineness, purchasers should see that every bottle has on the LABEL the name of

"THE APOLLINARIS COMPANY (LIMITED) LONDON."

Æsculap

A POSITIVE CURE FOR STOMACH, LIVER & KIDNEY AFFECTIONS.

The Only Palatable Natural Aperient Water.

THE BEST HOUSEHOLD REMEDY & SPECIFIC FOR CONSTIPATION

Highest Award at the International Medical Exhibition, 1881. Retail 1/6 & 2/- per Bottle.

A SUPPLY OF CIRCULARS WITH NAME AT FOOT AND DESCRIPTIVE PAMPHLETS FREE ON APPLICATION.

Chemists can safely stock this Water, as it will continue to be well advertised.
It is prescribed by all the leading Medical Men.

ÆSCULAP BITTER WATER COMPANY, Limited, 38, Snow Hill, LONDON, E.C.

KAY BROTHERS,

Operative Chemists and Wholesale Druggists,

(Successors to SIMS, SHAW & HORNBY. Founded 1786).

STOCKPORT,

MANUFACTURERS OF

Acid Sulphurous.
Bird Lime.
Dec. Senegæ Co. Conc.
,, Sarzæ Co. Conc.
Emp. Plumbi.
,, Roborans.
,, Resinæ.
Emp. Picis.
Ess. Zingib (Soluble).
,, Rosæ. Co.
Oxymel Scillæ.
Syr. Ferri Phosph. Co.
,, Rhœados.
,, Violæ, &c., &c.

"COAGULINE" TRADE MARK.

Kay's New Transparent Cement for Broken Articles.

KAY'S COMPOUND ESSENCE

Of LINSEED, ANISEED, SENEGA, SQUILL, TOLU, &c. (with Chlorodyne).

"The Stockport Remedy" for Coughs and Colds.

LINSEED LOZENGES (Solidified Linseed Tea).

CHLORO-LINSEED COUGH LOZENGES.—A medicated Linseed Extract. [Hoarseness, &c.

KAY'S THROAT LOZENGES, for Relaxed or Sore Throat,

KAY'S INSTANT CURE for Toothache.

PAINLESS SOLVENT for Corns and Warts.

LINUM CATHARTICUM PILLS (of the Purging Linseed).

KAY'S TIC PILLS.—A specific and pure Nerve-Tonic.

STRAMONIUM CIGARETTES.—For Asthma.

CUE CEMENT.—For tipping Billiard Cues.

IMPROVED CUE TIP FIXER.

MARKING INK for Linen.

ARNICA HEALING POWDER.—Toilet.

KAY'S TUBES for Feeding Bottles, with patent glass valve. Fit all bottles, and prevent children sucking air.

KAY'S RESPIRATORS.—GOLD PLATED, 2/6 and 5/6.

SAPO-LINI, a Saponified Linseed Jelly; an excellent Toilet Soap.

All articles containing Scheduled Poisons are so labelled.

THE BEST ELASTIC STOCKINGS, **LEGGINGS, SOCKS, KNEE CAPS, &c.** } 25 % discount to Chemists.

Prices, Circulars, Show Cards, Specimens, &c., on application.

KILNER BROTHERS,

Glass Bottle Manufacturers,

10, Gt. Northern Goods Station

KING'S CROSS, LONDON,

Invite the attention of Chemists and others to the large variety of Glass Bottles, &c., that they supply, and solicit orders for same.

DISPENSING.—Green and White Flint, of all sizes and shapes.

PERFUMERY.—White Flint, in different styles.

FEEDING BOTTLES.—"Our Babies' Bottle," in Green and White Glass, with white, brown or black fittings.

Illustrated Catalogues and detailed Price Lists of above and many other kinds forwarded on application.

BISHOP'S
GRANULAR EFFERVESCENT SALTS

Established 1857.

The LANCET, writing of Bishop's Preparations, says:—"Their excellence is well known."
The BRITISH MEDICAL JOURNAL says:—"The name of Mr. Bishop is a sufficient guarantee that the article is skilfully prepared."

BISHOP'S
Granular Effervescent Citrate of Caffeine.

THE BEST KNOWN REMEDY FOR HEADACHE.

This Salt has been most extensively used as a remedy for sick headache, and with such great success, that it may almost be called a specific. It relieves all disorders of nerve-function, and is at the same time most cooling and refreshing.

BISHOP'S GRANULAR EFFERVESCENT CITRATE OF CAFFEINE is sold in bottles at 2*s.* 6*d.* each. With each bottle is supplied a wooden Measure Cup, which when filled, but not heaped, gives an exact dose. The Granular Effervescent Citrate of Caffeine should be taken at the commencement of an attack of headache, and the dose should be repeated in an hour if any pain should remain. Testimonials from the most eminent medical men in the profession enclosed with each bottle.

An eminent Birmingham Physician writes:—"I like the EFFERVESCENT CITRATE OF CAFFEINE prepared by Bishop very much. It is a particularly valuable medicine as a morning restorative; and after brain exhaustion, or where sedentary occupation have reduced the tone of the system, it may be taken with perfect safety and great advantage."

BISHOP'S
Granular Effervescent Citrate of Potash.

Contains eight grains of this anti-febrile salt in each drachm, keeps well, and yields a delicious effervescent draught. It is more efficient, more economical, and more convenient than the ordinary alkaline waters, and much superior to the various mixed powders, which consist mainly of Tartrate of Soda.

The late Mr. Fewtrell, Analytical Chemist, wrote:—"It is the nicest effervescing preparation I have ever tasted, and is infinitely pleasanter than the bottled waters."

Dr. G. O. DREWRY, in his "Common Sense Management of the Stomach," recommends for Indigestion, Constipation, &c., the "GRANULAR EFFERVESCENT CITRATE OF POTASH" as a very agreeable, mild, and cooling laxative, when taken in doses of one dessertspoonful in half-a-pint of water before breakfast.

BISHOP'S
Granular Effervescent Mineral Water Salts.

For the preparation of artificial waters, these Granular Effervescent Salts are especially suitable. They give a refreshing draught, and may be relied on as presenting at the same time the chemical ingredients of the natural waters. It is obvious that in this form the Granular Effervescent preparations present many advantages over the waters themselves. Whilst all the constituents of the natural springs are reproduced, the Salts are extremely portable, more economical, and with them a sparkling refreshing draught is procurable in any quantity at any time. Among the Mineral Water Salts thus prepared may be named, CARLSBAD, KISSINGEN, PULLNA, SELTZER, VICHY, LITHIA, FRIEDRICHSHALL, &c., &c. In each case a teaspoonful of the Salt in half-a-tumbler of water will produce a draught similar in effect to the natural water. The Seltzer Water has been long recognized, both in this country and in Europe, as an excellent tonic and mild aperient.

BISHOP'S
Granular Effervescent Citrate of Magnesia.

A perfectly white and delicately clean preparation, prepared from Salts obtained from the Pure Fruit Juices of Lemons and Grapes.

The best Chemists in Great Britain and the Colonies keep no other "Granular Effervescent Citrate of Magnesia" than "Bishop's." The reason for this universal preference is that, since its introduction in 1857, it has been found that none of the Imitations of this preparation, *originally introduced by Mr. Bishop*, have been able to compare with it in reliability as a medicine, or in *purity* and *freshness of flavour* as a *cooling drink*. Full directions on each bottle.

Sold in convenient sizes to suit the Buyer.

Report on Mr. Bishop's Granular Effervescent Preparations. By Prof. Attfield, Ph.D., F.R.S., F.I.C., F.C.S., Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, Author of a Manual on General Medical and Pharmaceutical Chemistry.

Mr. Bishop's Granular Effervescent Preparations have been known to me for more than twenty years. The maker has submitted to me the formulæ for them; I have seen them compounded at his factory; I have more than once tested the materials he uses; I have many times analysed the finished products. The formulæ are excellent, the ingredients pure, the processes perfect, the products all that can be desired.

(Signed)

JOHN ATTFIELD.

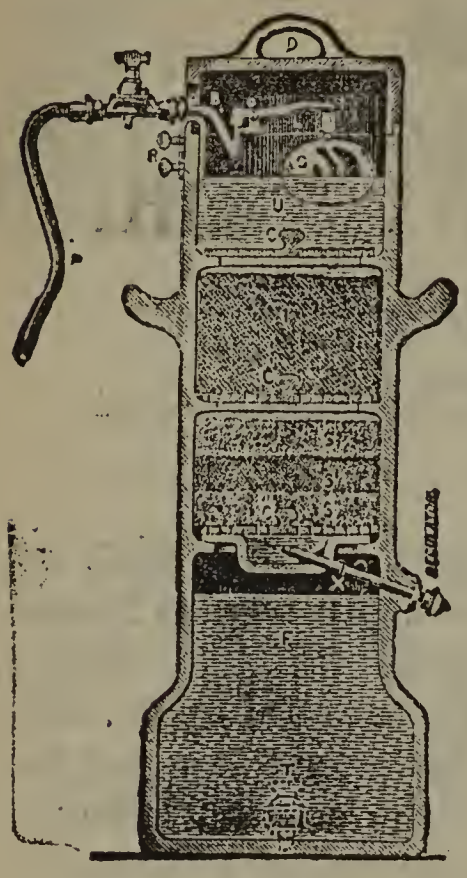
London, Dec. 6, 1881.

Observe the Name on the Seal, the Registered Trade Mark on the Label, and full address of

ALFRED BISHOP, *Manufacturing Chymist,*
17, SPECK'S FIELDS, Mile End New Town, London.

Messrs. JOHN WYETH & BROTHER are Sole Agents in the United States for Mr. Bishop's Preparations, and keep Stock of all the above Products.

Special Ball-Cock Filter.



SPONGY IRON FILTER.

PREVENTION OF ZYMOTIC DISEASE.

From "The XIX. Army Medical Report" for 1877, *p.* 143:—"*Fort George was the only station where zymotic diseases threatened to become epidemic, and where a positive insanitary condition has been reported, viz., The Water Supply.*"

From "The XX. Army Medical Report" for 1878, *p.* 156:—"*Fort George.—The Water at Fort George has at length been remedied by filtration through Spongy Iron Filters. The analyses after filtration were very favourable, and all complaints, so loud before, have ceased.*"

NO OTHER FILTER HAS RECEIVED SUCH OFFICIAL RECOGNITION.

(Other Extracts from Official Reports on Prevention of Zymotic Disease by Spongy Iron Filters, Free on Application.)

EXTRACTS FROM OFFICIAL REPORTS ON WATER FILTRATION.

SPONGY IRON.

"XIX. Army Medical Report," pp. 170-171

"*This is a very powerful filtering substance. . . . The water filtered shows no tendency to favour the growth of low forms of life, and may be stored with impunity; water may also be left in contact with the medium for an indefinite period without undergoing any deterioration.*"

ANIMAL CHARCOAL.

"VI. Report on Rivers Pollution," p. 220

"*The property, which Animal Charcoal possesses in a high degree, of favouring the growth of the low forms of organic life, is a serious drawback to its use as a filtering medium for potable waters.*"

See also "XIX. Army Medical Report," p. 170.

CHARCOAL IN POROUS BLOCKS.

"XIX. Army Medical Report," p. 170.

"*Water filtered through them and stored shows signs of the formation of low forms of life. . . After a time the purifying power becomes diminished in a marked degree, and water left in contact with the filtering medium is apt to take up impurity again.*"

? ? WHY SHOULD ANIMAL CHARCOAL, HAVING BEEN PROVED UPON THE ABOVE OFFICIAL EVIDENCE TO FAVOUR THE DEVELOPMENT OF ONE KIND OF BACTERIA, *A PRIORI*, BE SUPPOSED TO *DESTROY* SUCH BACTERIA AS THE BACILLUS OF CHOLERA OR TYPHOID? ? ?

Extracts, Testimonials, Price Lists, &c., Free.

SPONGY IRON DOMESTIC FILTER COMPANY

22, NEW OXFORD STREET, LONDON, W.C.

THE GALENICAL PHARMACY OF THE NEW PHARMACOPÉE FRANÇAISE.

(*Continued from page* 104.)

Julep, both in French and English was the familiar name for *Potion*, Mint Julep being in proof. *Looch* is a potion made into the form of an emulsion of a somewhat thick character.

Looch Blanc.

Potion Émulsive Gommée.

Sweet Almonds	30 grams.
Bitter Almonds	2 „
White Sugar	30 „
Gum Tragacanth. (pulv.) .	50 centigrammes.
Orange Flower Water . .	10 grams.
Distilled Water	120 „

But when calomel is added use:—

Looch Huileux.

Potion Emulsive Huileuse.

Ol. Amygd. dulc.	15 grams.
Pulv. Gum. Acaciæ	15 „
Gum Syrup	30 „
Aq. Flor. Aurant.	15 „
Aq. Destillat.	100 „

Potion Simple.

Simple Syrup	30 grams.
Orange Flower Water.	20 „
Distilled Water	100 „

A new preparation. The Gum Arabic being omitted, as likely to be an incompatible, from the old Potion Gommeuse.

In the Potion Cordiale the hospital formula has been adopted.

The proportion of leaves and flowers generally serving for infusions and decoctions is 1 : 50 ; for woods, stalks and roots, 1 : 25.

Eau Gommée, Mucilage, is made 1·25. Powders or mineral substances are to be mixed with gum or syrup ; tinctures to be added to syrup of gum mucilage first ; and very volatile substances such as ether and ammonia to be added last.

Poudres.—Pulveres, one hundred and seventy-five in number are prepared by pulverization, or by being passed through a sieve, *tamisage*. These sieves (*tamis*) are made of silk, brass wire (*laiton*) or of horsehair (*crin*) in which last case horsehair called tissus de Venise should be employed. Metallic sieves with large meshes go under the name of *cribles*, answering to our word, "riddles." Directions for reducing substances to powder are subjoined, and simple and compound powders are treated under one head. The old terms of *contusion*, *trituration* and *mouture* (grinding) have been discarded ; as well as *frottement* (rubbing over a sieve) : *porphyrisation*, pounding in a mortar ; and *dilution*, or separating the finer from the grosser particles by means of water, corresponding to *our* word, levigation. As the preparation of powders has received special attention, old and new formulæ need not be compared except in a few necessary instances.

James's antimonial powder has been withdrawn, in company with Poudre Tempérante de Stahl, which was a mixture of nitre, sulphate of potash and red sulphuret of mercury.

Armenian bole, chalk and other argilaceous substances are powdered and then levigated, and dried, the operation being renewed till all the finer particles have been separated.

Poudre pour la Conservation des Cadavres.
(New formula.)

Carbolic Acid,		
Alcohol 90°,		
Essence of Thyme	āā	200 grams.
Zinc Sulphate, commercial . .		2000 grams.
Pulvis Ligni		10,000 grams.

There are four tooth powders, Acide, Alkaline, Charcoal and Cinchona, and Camphorated Chalk.

Four Gazogene Powders.—Alkaline (Sodæ Bicarb. and Acid. Tartaric.).

Ferrugineuse (with the addition of sugar and ferrous Sulphate).

Laxative (Sodæ Bicarb., Sodæ Potass. Tart., Acid. Tartaric.)=Seidlitz Powder.

Neutre (Sodæ Bicarb., Acid. Tartaric.)=Seltzer.

Poudre d'Ipécacuanha Opiacée. — Poudre de Dower.—Why our French neighbours who occasionally come by way of Dover, though they may never have heard of Lord Dover, who gave his name to the preparation, should always spell it with a *w*, is one of those mysteries time alone will reveal. Much discussion having taken place with regard to the change in this formulæ, those of the British ; Codex, 1866 ; and Codex, 1884, are given for comparison. Dried opium, it will be seen, has replaced the dried extract and liquorice powder.

Pulvis Ipecacuanhæ Compositus, B.P.
Pulv. Doveri.

Ipecacuanha Powder	½ ounce.
Opium Powder.	½ ounce.
Sulphate of Potash	4 ounces.

(Powder.)

Poudre de Dower. Codex, 1866.

Potassæ Nitras	40 grams.
Potassæ Sulphas	40 grams.
Pulv. Ipecacuanhæ	10 grams.
Pulv. Glycyrrhizæ	10 grams.
Extract. Opii.	10 grams.

(Dried and powdered).

One gram contains 9 centigrammes of dry Extract of Opium.

Poudre de Dower. Codex, 1884.

Potassæ Nitras	40 grams.
Potassæ Sulphas	40 grams.
Pulv. Ipecacuanhæ	10 grams.
Pulv. Opii. (siccat.)	10 grams.

One gram contains 10 centigrammes of Powdered Opium, which equals about 5 centigrammes of Extract of Opium.

In the second edition of the Codex, Poudre de Savon (Pulv. Saponis) is ordered as Savon médicinal, *i.e.*, made with Oleum Amygd. dulc., and the same remark applies to Emplâtre de Savon (Emp. Saponis). Poudre de Vanille Sucrée is a simple mixture of sugar and Vanilla ; when crystallized Vanilla is desired use the following formula:—

Vanillin	2 grams.
Alcohol, 90°	q.s.
Powdered Sugar	98 grams.

Dissolve the Vanillin in spirit and mix with the sugar.

Pulpes.—Pulps need not be noticed ; those of Cassia fistula, Prunes and Tamarinds, specially the last, are used occasionally by ourselves.

Four *Resins* are official preparations : those namely of Jalap, Podophyllum, Scammony and Thapsia. The mode of operation need not be described : water and alcohol being employed in the usual manner ; the spirit being recovered by distillation.

The Resin of podophyllum, Podophyllin, is a new introduction.

Saccharures differ only from Oléosaccharures in

containing no essential oil; two are official: Saccharure de Lichen and Saccharure de Carragheen, assimilated in strength and made with equal parts of Iceland or Carragheen moss and sugar; the lichens being previously deprived of bitterness.

Savons. Sapones. Two, as before, are official. Savon animal has ceased to be prepared from Beef-marrow.

Savon Animal. Sapo Animalis.

Calf-fat	10
Soda Lye	5
Distilled water	20
Chloride of Sodium	2

Melt the fat with the water; add the caustic soda by degrees, and heat to complete saponification. Add the salt and thus separate the supernatant soap: collect and run into moulds.

Savon Médicinal.

Ol. Amygd. dulc.	2100
Soda Lye	1000

Expose to the air for one or two months so as to get rid of excess of alkali.

Sinapisme. Mustard Poultice. A formula is given for Mustard Paper under the name of Sinapismes en Feuilles, and as this preparation is very popular, and used by ourselves, the directions are reproduced.

Charta Sinapis.

The mustard must be deprived of all fatty matters; the adhesive agent must contain neither water, alcohol, resin, nor fatty matter; nor must it be of the nature of a plaster. Submit the mustard farina to strong pressure, and wash with sulphide of carbon or petroleum essence. Spread on paper an adhesive liquid formed of a solution of 4 or 5 parts of caoutchouc in 100 parts of mixed carbon sulphide and petroleum essence. Sprinkle over the freshly coated paper by means of a sieve, the prepared mustard. Pass between two rollers, and afterwards gently warm to promote volatilization of the liquid solvents used.

Cut to pattern as required.

Sirops.—An English writer hesitates long and with some feeling of apprehension before he ventures on the subject of French syrups; they are so numerous and so unlike British formulæ.

No less than 121 are now official, being an advance of 6 on the former Codex. The sugar forms about two-thirds of the weight of the finished preparation; but where wine or acid juices enter into their composition, the quantity of sugar is diminished. Clarification is effected by means of slightly diluted white of egg, or paper made into a paste. The syrup is raised to the boiling point; and the coagulated albumen skimmed off and removed.

With such voluminous materials for comment it has been thought best to point out important changes and to leave further details to those specially interested in foreign dispensing.

Sirop de Codéine is made by the direct addition of Codeine dissolved in alcohol to simple syrup. The first edition gave alcohol at 90°; but as it had been stated previously that Codeine was very soluble in spirit, the formula was blamed in French journals and alcohol at 60° is now ordered. Twenty grams contain 4 centigrammes of the alkaloid.

Sirop d'Éther.
(Altered formula.)

Simple Syrup (cold preparation)	700 grams.
Alcohol at 90°	50 „
Distilled water	230 „
Ether (official)	20 „

Sirop de Gomme, is not now added direct to Simple Syrup but has the formula—Gum Arabic' 10; Distilled water, 43; Sugar, 67.

Sirop de Tolu: the strength of the balsam has been diminished in the formula by one-half; in reality it is little altered for the water will only take up a certain quantity. The sugar has been also diminished. The finished syrup is to be rendered clear by filtration. The whole process is opposed to our experience. Add sugar to *hot* solution of Tolu in water, and in not less proportion than 2 : 1 and the syrup will be beautifully bright.

Sirop de Fleurs de Pêcher is ordered to be prepared from the dried flowers, not from the juice.

Sirop de Vinaigre Framboisé, consists of equal parts of the syrups of Vinegar and Raspberries.

The following are new: Sirop de Coca (leaves), Eucalyptus (dried leaves), Jaborandi (leaves). All in proportion of 1 : 15 boiling water. Infuse six hours and strain. Add sugar 18 : 10 strained infusion.

Sirop de Brômure de Potassium. KBr, 1; Aq. Dest., 1; Syr. Aurant, 18; that is 1 : 20. Sirop de Brômure Ferreux, mentioned in the preface, we have as yet been unable to discover.

Sirop de Chloral.

Chloral Hydrate (crystals)	10
Distilled Water	9
Simple Syrup (cold preparation)	180
Essence Menth. Pip.	1

Sirop de Chlorhydrophosphate de Chaux (Calcium neutral phosphate) the quantity of the calcium salt has been corrected to 12 gr. 50 c. Twenty grams of syrup contain 25 centigrammes of bicalcic phosphate. No analogous sodium syrup appears though mentioned in the preface.

Sirop d'Hypophosphite de Chaux. Calcis Hypophosphite, 1; Syr. Flor. Aurant., 10; Simple Syrup (cold preparation), 89. Twenty grams of syrup contain 20 centigrammes of alkaline salt.

In this case there is a similar preparation of Sodium Hypophosphite.

The syrups of lactophosphate, and phosphate acide de chaux are new; while Sirop de Raifort iodé (Iodized syrup of Horseradish) has been added to the Sirop de Raifort composé, the old Sirop Antiscorbutique

With regard to the Opium syrups, the Diacode as before contains 1 centigramme of Extract of Opium in 20 grams of syrup; the Thébaique (Sirop d'Opium) contains four centigrammes of Extract of Opium in 20 grams, being the stronger preparation. On the addition of half its weight to Teinture de Succin (Amber) it receives the name of Sirop de Karabé.

The Sirop de Pavot blanc (Syrupus Papaveris albi) banished from the Codex of 1866 has been reinstated; 20 centigrammes of Extract. Papaveris being contained in 20 grams of syrup.

Several syrups formerly official have been discontinued together with Syrup of Hydrocyanic acid which was deemed uncertain in composition and dangerous.

Rad. Aconiti is now ordered in the syrup of that name; in Sirop d'Amande, Almond Syrup, the universally known Sirop d'Orgeat, the quantity of emulsion to be obtained reads 2250 grams in the second edition as against half that quantity printed in error originally. A correction has been made in Sirop de Coquelicot (Syrupus Papav. Rhœad.)—Read Sugar 180 grams instead of 108 to 100.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, AUGUST 16, 1884.

THE BRITISH PHARMACEUTICAL CONFERENCE.

DURING the past week the British Pharmaceutical Conference has attained its majority, but it can hardly be said that the gathering at Hastings, under the presidency of Mr. JOHN WILLIAMS, with which it completed its twenty-first year, was suggestive of an excess of virility. It is true that, as remarked by the President, the meeting took place under exceptional circumstances. For the second time in the history of the Conference it had decided not to follow the lead of the British Association in respect to the locality it would visit, and the occasion was also marked by the initiation of an experiment in the shape of a "self-denying ordinance." How far either or both of these conditions affected the result, we are not prepared to say; we merely chronicle the fact that notwithstanding the attractions of Hastings, and its easy accessibility to the metropolis, the attendance of members was unusually small. We are afraid, therefore, that if, as indicated in the Annual Report, the Executive Committee is disposed to regard the present meeting as a test of what would take place were the Conference to cease to assemble annually in the same town as the British Association, a reform that we are inclined to think a desirable one will be indefinitely delayed.

The proceedings were commenced at half-past ten on Tuesday morning in the Assembly Room of the Castle Hotel. Apart from the announcement that Mr. BENGER and Mr. EKIN, the former after serving thirteen years as one of the Honorary General Secretaries and the latter after seven years as Treasurer, had expressed their intention not to accept again the respective offices, the principal feature in the annual report was the allusion to a vigorous effort that had been made to extend the membership in India and the colonies. We think that so far as this attempt may prove to be successful it will be a clear gain to the interests of pharmacy, and therefore to the Conference. But it must not be forgotten that an accession of members residing thousands of miles from the ordinary itinerary of the Conference, although it may swell the numbers, is not likely to furnish recruits to more than a nominal extent to the most characteristic portion of the operations of the Association, the partly scientific, partly social meetings, such as the one held on the south coast during the past week. The Treasurer's report showed that once more the expenditure had exceeded the receipts. This, in reply to a question put by Mr. BOTTLE, was attributed to the expense of distributing copies of the address delivered by Professor ATTFIELD last year, and to the cost of a special "whip" that had been made to secure new members at home and abroad. It is not quite apparent, however, from the accounts presented, how the whole of the deficit—about £150—can have been due to the causes mentioned, and had it not have been for the statement made by one of the Honorary General Secretaries we should have inferred that there had really been an "outrunning of the constable" to some extent. However this may be, we believe that many of the members will be pleased to observe that that item is not likely to occur again in the accounts, and that the broadcast touting which had come to be looked upon as a periodical event is to be abandoned in favour of an appeal simply to such persons as may pass the examination qualifying as a chemist and druggist each year.

The Address of the President was not conceived in a very ambitious spirit, and the company who assembled to hear it was not so numerous as some other meetings on similar occasions in previous years; but the delivery of it was none the less a great success. The President was not decoyed by the example of his predecessor, on two separate occasions, into entering the field of pharmaceutical politics, which has always been held at meetings of the Conference to be tabooed ground when any one of less degree than the Chairman has proposed to enter it. The principal theme on the present occasion was a few points which seemed to have a bearing, more or less remote, upon those branches of science with which pharmacists, as a body, are particularly connected. As the Address is printed *in extenso* on another page it need be referred to only briefly here. Starting with a reference to the consequences following upon the discovery of the tinctorial properties of some derivatives from coal tar, obtained during an abortive attempt to build up quinine, the speaker illustrated the way in which succeeding investigators, whilst endeavouring to wrest similar secrets from Nature, have acquired knowledge concerning various natural compounds which pharmacists have to manipulate that has led to more or less successful attempts to build them up artificially. Then came the important question whether the artificially combined compounds produced the same medicinal effects in the human system when administered as those they were designed to represent, and therapeutists, no less than pharmacists, will note with interest that a man of such wide practical experience as Mr. WILLIAMS is not prepared at present to answer that question in the affirmative. From the vegetable principles to the plants in which they are formed was but a step, and in a few sentences it was made evident how what might appear to be most abstruse researches upon physiological botany may have a very important bearing upon the operations of practical pharmacy. In a like manner, the successful liquefaction of gases that had been looked upon as refractory was, after a parenthetic reference to the relatively narrow limits of temperature within which the life of organized beings is possible, made to have a business application that will probably be

suggestive to many of the hearers. The new pharmacopœias, the justice of the claim of pharmacists to be officially represented on future committees charged with the compilation of such works in this country, and the compilation of an International Pharmacopœia were the topics to which the latter part of the Address was devoted, the treatment of each being such as commended itself to the approval of the audience, as we think it will also to most who make their first acquaintance with the Address by reading it. We may add that although through a slight misunderstanding the comments at the conclusion of the Address were unusually few, Mr. WILLIAMS had ample reason to be gratified by the manner in which the Conference subsequently created an opportunity for expressing an opinion respecting it.

The reading of communications commenced as usual with reports from gentlemen who had undertaken the investigation of various subjects, partly at the expense of the Conference. As it is proposed to follow our usual plan of printing these papers with the discussions that followed them in full, we shall simply refer here to the most salient features in them. The first two were from Mr. W. ELBORNE, and were upon the subject of English Rhubarbs. It would appear that English-grown "rhubarb" from *Rheum officinale*, the plant which was first brought to Europe about sixteen years ago (*Pharm. Journ.*, [3], iii., 301), has now taken its place side by side in commerce with that from *R. rhaponticum*, from which it may be distinguished upon fracture by the comparatively black colour of the veins imbedded in a white parenchymatous tissue. The excessive development of this tissue, observed in the earlier experimental samples of this variety by Mr. HOLMES (*Pharm. Journ.*, [3], vii., 301), was no doubt due to "high cultivation," and it has been found that with a slower growth the roots become more dense, and when prepared are of a richer and darker colour. One of the reports was devoted to some historical, botanical, and microscopical notes on English-grown rhubarb, and the method of its preparation, and the other gave the results of a series of analyses showing to a certain extent the constituents of samples of English "officinale" and "rhaponticum," East Indian and the old-fashioned Russian rhubarbs. It was mentioned that the production of English rhubarb now amounts to twelve thousand pounds weight yearly.

Mr. A. W. GERRARD presented a final report upon the alkaloidal value of wild and cultivated belladonna plant. Summing up the results of his researches, he stated that they had shown that wild belladonna generllay contains more alkaloid than the cultivated, though not to an important degree, but that the cultivated plant is the better suited for the manufacture of pharmaceutical preparations on account of its greater uniformity. He had found the leaf to be the part of the plant richest in alkaloid, the root, fruit, and stem being next in order. He therefore suggested that preparations of belladonna leaf should supersede those of the root, except in the case of the liniment, and he also advocated the introduction of a formula for an alcoholic extract into the British Pharmacopœia. With regard to the time of collection, Mr. GERRARD is of opinion that the growth of the leaf does not affect the proportion of alkaloid in the root and that the two parts may, therefore, be collected without disadvantage at the same time. Closely connected with the same subject was the report of Messrs. DUNSTAN and SHORT upon the "Estimation of the Alkaloids in *Atropa Belladonna*." This was a summary of a paper recently read before the Pharmaceutical Society, describing a process in which the root is exhausted by hot percolation with a mixture of chloroform and absolute alcohol, the alkaloids extracted from the percolate by shaking it with water and then withdrawn from the aqueous solution by agitation with chloroform after the addition of ammonia. Next Mr. HASSELBY recounted the steps in an attempt to carry out in the garden attached to his house in Hastings a suggestion made by the President of the Conference last year that pharmacists should as far as possible grow their own supply of vegetable drugs. His experiments had been made upon belladonna and henbane, the former yielding tolerably good results, whilst the latter had not given so much satisfaction. The discussion that followed the reading of these three papers turned principally upon the subject of cultivation and the effect of it upon the active principles contained in plants; but Mr. GERRARD also mentioned some experiences met with in the cultivation of henbane that have led him to suspect either the existence of three varieties or of a hybrid between the two at present recognized. The suggestion as to the substitution of leaves for the root of belladonna in making pharmaceutical preparations did not appear to be regarded with favour by Professor REDWOOD, who thinks the leaves are much more liable to undergo deterioration than the root.

On resuming after luncheon, the first paper read was a "Report upon an Investigation on the Chemistry, Botany and Pharmacy of the Strychnos Nux-Vomica," by Messrs. DUNSTAN and SHORT. This was a *résumé* of work done with the financial assistance of the Conference, which has formed the subject of a series of papers that have already appeared in this Journal. The principal points have been the devising of what the authors claim to be a simple and accurate process for estimation of the alkaloids of nux vomica seeds, in which a mixture of chloroform and alcohol is used for their exhaustion; the application of the process in the examination as to their alkaloidal value of nux vomica seeds from various sources, with the result that of the kinds entering the British market, the Bombay was found to be the richest, followed by Cochin and Madras, whilst

all the varieties contained more alkaloid than had been previously supposed ; a method for separating brucine and strychnine, based upon the different solubility of their ferrocyanides; the examination as to alkaloidal strength of galenical preparations of nux vomica, leading to suggestions for the standardizing of the tincture and extract which no doubt were the provoking cause for two other papers read at the Conference ; the discovery of a new glucoside, which has been named "loganin," in the pulp of the fruit and the seeds ; and the examination of some nux vomica seeds from Ceylon that proved to be unusually rich in alkaloid.

In some "Notes on the Estimation of Hydrocyanic Acid and Cyanides," Mr. L. Siebold reverted to the subject of a communication read by him last year,—the error to which Liebig's process for the volumetric estimation of hydrocyanic acid is liable if the titration be effected in presence of a deficency of alkali and the failure of litmus to indicate the point of neutralization. After alluding to weak points in several suggestions that have been made for overcoming this defect, he recommended the use of a standard solution of soda and the performance of a preliminary titration. He also mentioned that in working upon the United States official process, in which an excess of calcined magnesia is used instead of soda, he had found that with certain precautions the carbonates of the alkaline earths might be used, and that, in the presence and by the interventions of silver nitrate, hydrocyanic acid is capable of decomposing such minerals as chalk, calc spar and magnesite.

The next paper, "Further Notes on the Pharmacy of Linseed," by Mr. T. Greenish, gave rise to the most animated discussion of the day. Mr. Greenish is of opinion that serious objections apply to the use of linseed cake as a source of the official farina lini, one of them being that it is a bye-product and not specially made for the purpose. He would prefer, in its place, linseed rich in farina and as free as possible from weed seed, crushed lightly between iron rollers without expressing any oil, and with about 20 per cent. of the husk removed to make it approximate more closely to a meal. Mr. Greenish stated that when the seed is thus crushed lightly, the oil is hardly disturbed in its natural cells and does not become diffused throughout the meal so as to be exposed over a large surface to atmospheric influences. He also explained the part played by the husk in yielding in contact with water a supply of vegetable mucilage, and said that though the retention of 80 per cent. was equal to the necessities of forming a good plastic poultice, the removal of too large a quantity would leave the farina incapable of doing so. Professor Redwood, whilst admitting the value of the paper, said that when, years ago, crushed linseed came into use it did not answer expectations and was found to turn mouldy when kept in closed vessels. Moreover, he was disposed to believe that under the present system of examination of linseed by the Linseed Association, it must necessarily be very pure and free from admixture of foreign seeds. There seemed to be diversity of opinion as to the explanation of the existing preference for crushed linseed, some speakers attributing it to an actual superiority, and others thinking that it is due to some medical practitioners specially instructing their patients to use it.

The first day's proceedings were brought to a close by the reading of two papers upon the subject of "Standardizing," one by Mr. G. F. Schacht and the other by Mr. D. B. Dott. That Mr. Schacht does not look with favour upon the proposal to standardize all powerful pharmaceutical preparations is pretty well known. In the present paper he argues that such preparations are divisible into two classes, one consisting of those that are dilutions of definite chemical substances, and so allow of being standardized, and the other of preparations of more or less complex substances, concerning the mode of operation of which little is yet known. In the present empirical state of the practice of medicine, he maintained, it would be worse than useless to pretend to standardize such preparations in respect to their contents in active principle, and he said that even if the case were different it would be for pharmacy to assist in the inquiry, not to initiate or conduct it. Mr. Dott also considers that the attempt to standardize certain preparations would be misleading, and he would see in the alleged variations in their contents rather a reason for their disuse. But he believes that, in nearly every case, if the material operated upon be of proper quality the preparations will be of the right strength. These papers, perhaps on account of the hour, did not give rise to so much discussion as might have been expected, but some disposition was evinced to concur with the writers. Professor Redwood, however, said he saw no reason why preparations of such drugs as opium, cinchona and other drugs containing known active principles should not be standardized as far as possible, leaving what was not yet understood alone.

The proceedings were recommenced on Wednesday by the reading of a note by Mr. Keyworth, entitled "A Fossil Aloe from the Wealden," in which the author had found scope for a flight of the scientific imagination and the executive committee an opportunity for showing the extent of its faith in believing the paper had a bearing on anything pharmaceutical. Mr. Naylor followed with more information respecting hymenodictyonine, the alkaloid from *Hymenodictyon excelsum*, which he has now coaxed to crystallize and represents by the formula $C_{23}H_{40}N_2$. It is inferred from the results of experiments that it is a tertiary diamine closely analogous with nicotine, with which probably it is homologous.

Mr. Willmott's "Note on the Filtration of Lard" was a defence of the position taken by him, in a paper read at the last previous Conference, that the

operation of filtering in the preparation of lard is not the most advantageous. His more recent experiments have led him to the conclusion that the operation of filtration is more honoured in the breach than the observance, better results having been obtained by straining through flannel, which Professor REDWOOD is inclined to attribute to the fat not being exposed to atmospheric oxidation so long or over so large an extent of surface. Mr. NAYLOR said he preferred to melt the flare at a low temperature and filter it as rapidly as possible through paper. In the discussion Professor REDWOOD incidentally alluded to the vast number of communications that had deen received by those engaged on the new Pharmacopœia, some of which recommended the entire exclusion of animal fats; but he said he could not agree with the proposition, as, in his opinion, there is no substance comparable, as a base for ointments, with good, well prepared, sweet lard, freed at a low temperature as far as possible from extraneous organic matter.

"The Composition of Seidlitz Powders" formed the subject of a paper by Mr. MARTINDALE, who said his attention had been drawn to the subject by the complaint of a customer as to the formation of a foam or scum on the top of the effervescence when some powders supplied by him were dissolved. Upon investigation he found this scum to be due to the formation of cream of tartar when the acid was in excess, and that it more readily occurred when the weather was cold. After referring to the varying receipts current for the preparation of seidlitz powders, he expressed an opinion that an authoritative formula ought to be inserted in the Pharmacopœia, to be followed when powders were supplied upon the prescription of medical men.

The next paper was on "The Pungent Principles of Plants," by Dr. THRESH, which might conveniently have been preceded by one by the same author, read subsequently, on "The Proximate Analysis of *Alpinia Officinarum*." In the latter paper Dr. THRESH described the manner in which he had isolated from galangal rhizome an active pungent principle, which he has named galangol. In the former he dealt with certain points of resemblance between this and other pungent principles, especially gingerol, from ginger, capsaicin, from capsicum, and paradol, from grains of paradise.

A note by Mr. SOUTHALL followed, on a specimen of a kind of a gigantic truffle used by the natives of Tasmania as food, which had been presented to the Conference by Mr. MILLER. The fungus is referred by Mr. SOUTHALL to *Mylitta Australis*, of which he considers it to be the sclerotioid mycelium; it consists principally of pectin.

The last paper read at the Wednesday morning session was a note by Mr. WILLIAMS upon some products obtained during the preparation of some specimens of colourless and anhydrous essential oils. The oils were distilled from a fusible metal bath. After all the water, mixed with a little oil, had passed over, the anhydrous oils were collected up to a point when the temperature rose more rapidly and a coloured fraction commenced to distil. The distillation was then continued into another receiver until just before decomposition would commence. The colourless anhydrous oil was, as a rule, very much modified in odour and more delicate than the coloured portion, whilst the odour of the residue was strong and sometimes offensive. Mr. WILLIAMS appears to think that by this treatment the colourless portions had not only had their aroma improved, but were probably rendered more permanent. Naturally the questions were raised in the discussion whether the foul-smelling portions might not have been products of the process and not educts, and to what extent the odorous constituents might be destroyed or removed with them. It may be worth recalling that an opinion has been expressed by Professor DRAGENDORFF that the odour of an essential oil may be due to a constituent present in extremely minute quantity (*Ph. J.*, [3], vi., 723).

Upon the reassembling of the Conference there were still ten papers on the list unread, not one of the authors of which was present. The principal points in the papers were, therefore, read by the Honorary Secretaries, Messrs. BENGER and PLOWMAN, and as the circumstances were not favourable to much discussion the proceedings were brought to a conclusion about the usual hour. The first was a note on "Tincture of Quinine," by Mr. T. WRIGHT, which contained an account of many interesting experiments as to the causes of precipitates that form in it and the way of avoiding them; the outcome of which was the conclusion that a concentrated neutral tincture of quinine of uniform strength could be best obtained by using the hydrochlorate of the alkaloid instead of the sulphate. In connection with this subject Mr. MARTINDALE expressed a hope that hydrobromate of quinine would be included in the next edition of the Pharmacopœia.

The next two papers were extremely technical. In one Mr. HODGKIN gave his reasons for supposing that "China bicolorata," or "Tecamez bark," is derived, like "cuprea bark," from a species of *Remijia*, which he is inclined to regard as a third species of the genus yielding cinchonine alkaloids and names *Remijia bicolorata*. In the other Mr. HOOPER, the recently appointed quinologist to the Government plantations in Madras, gave the results of the analyses of some old cinchona barks, the most notable point in which, perhaps, is that he found in one of them 1·99 per cent of quinidine, being more than had been previously observed in any bark.

Last year Mr. MABEN and Mr. CONROY reported to the Conference on the possibility of using sesame oil for pharmaceutical purposes, and expressed opposite opinions as to its availability for the manufacture of lead plaster, the former gentleman stating that it was suitable if a larger proportion of lead oxide were used than is ordered officially. He has since repeated and extended his experiments, and sent with his note describing them some samples confirmatory of his opinions. He obtained very good results when the proportion of lead oxide was increased 40 or 50 per cent.

Another paper by Mr. MABEN, in conjunction

with Mr. DECHAN, was a "Report on the Strength and Condition of Commercial Specimens of Hydrargyrum cum Cretâ, Pilula Hydrargyri and Unguentum Hydrargyri. "The statements contained in this communication will no doubt cause it to be studied with considerable interest and it provoked much comment among the members present at the Conference. Twelve specimens of grey powder were found to vary in the amount of unoxidized mercury they contained between 21·2 per cent. and 49·6 per cent.; mercurous oxide ranged between traces and 6·15 per cent.; and mercuric oxide between 0·65 per cent. and 4·67 per cent. Eight samples of blue pill were examined, six of which contained no trace of either oxide; they varied in percentage of mercury from 28·45 to 41·3 per cent. The samples of ung. hydrargyri also varied considerably, only one out of eight containing the B.P. proportion of mercury.

Mr. E. C. C. STANFORD has been pursuing his investigations of various bodies reputed to contain iodine and has now added oysters and burnt sponge to the list of those examined. Persons who have hitherto pinned their faith to the special medical efficacy of Anglo-Portuguese oysters being due to the iodine they contain, may perhaps, upon learning that this quantity is only equal to four parts in ten millions, feel they may extend their masticatory operations to other varieties without risking much loss. Turkey sponge turns out to be about four times as rich in iodine as honeycomb sponge.

In a "Note on Sulphurated Lime," Mr. DYMOND stated that some comparative experiments had shown that the best method of preparing it is to roast seven parts of finely powdered sulphate of calcium with one of charcoal until the black colour has disappeared. In another note he described a method for the estimation of diastase in malt extract.

Mr. MACEWAN communicated a "Report on Commercial Peruvian Balsam and the Methods for ascertaining its Purity." Twelve samples from different sources had been examined, and the author stated that so far as he is able to judge the present supply of the balsam is of good quality.

The last paper was a note by Mr. J. R. HILL on the "Presence of Copper in some Pharmaceutical Preparations," which seemed to indicate that the metal in question is frequently present where little suspected. The explanation is, no doubt, to be found in the use of copper vessels for pharmaceutical manipulations.

The concluding business was then proceeded with. Mr. KAY, in the name of the pharmacists of Aberdeen, gave a hearty invitation to the Conference to visit that city next year, and this, on the motion of Mr. BENGER, seconded by Mr. PLOWMAN, was accepted. The President then alluded to the loss the Conference was sustaining in the retirement of Mr. BENGER and Mr. EKIN, and proposed a hearty vote of thanks to those gentlemen. This, after being supported by Mr. SCHACHT and Mr. PLOWMAN, was carried by acclamation, and Mr. BENGER acknowledged the compliment. The election of officers for the ensuing year then took place, with the following result:—

President.—J. B. Stephenson, Edinburgh.

Vice-Presidents.—F. Baden Benger, F.C.S., Manchester; M. Carteighe, F.I.C., F.C.S., London; C. Ekin, F.C.S., London; J. P. Kay, Aberdeen.

Treasurer.—C. Umney, F.I.C., F.C.S., London.

General Secretaries.—S. Plowman, F.I.C., M.R.C.S., London; J. C. Thresh, D.Sc., F.C.S., Buxton.

Other Members of Executive Committee..—S. R. Atkins, Salisbury; J. A. Bell, Hastings; J. Borland, F.C.S., F.R.M.S., Kilmarnock; J. E. Brunker, M.A., Dublin; W. Hills, F.C.S., London; D. B. Dott, F.R.S.E., Edinburgh; W. A. H. Naylor, F.C.S., London; J. Sim, Aberdeen; W. H. Symons, F.C.S., F.R.M.S., London.

Local Secretary.—A. Strachan, Aberdeen.

Auditors.—H. J. Joseph, Hastings, and J. Paterson, Aberdeen.

Hearty votes of thanks were then given to the Local Committee, especially mentioning the names of Messrs. BELL, ROSSITER, KEYWORTH and JOSEPH, and a similar vote having been enthusiastically given to the President, the business proceedings of the Conference for 1884 terminated.

An hour afterwards a company of about sixty sat down to dinner, at which they were favoured with the presence of the Mayor. After dinner the toasts were limited to "The Pharmaceutical Conference," "The Town of Hastings" and "The Local Committee." When these had been responded to, the rest of the evening was devoted to music and conversation.

Provided that the weather be fine an excursion is usually a most agreeable adjunct to the Conference meeting, and this year it was perfection. On Wednesday morning a party of about one hundred ladies and gentlemen left the Castle Hotel in four-horsed breaks and other vehicles which proceeded along the beautifully wooded road to Battle Abbey. Arrived there, a guide accompanied the party through the different parts of the Abbey and grounds, and his description of the Battle of Hastings was kindly supplemented and to some extent contradicted by a lucid statement from Mr. THOMAS HORSHAM COLE, a local antiquary. Whilst the party was passing through the beautiful library the Duke of CLEVELAND entered and gave a most courteous welcome. From Battle the company proceeded to Ashburnham, where they were admitted to the rare privilege of seeing the famous artistic, literary and other treasures of that mansion, many of them specially associated with the Stuart kings, and of strolling through the beautiful gardens and grounds. Normanhurst was next visited, but before venturing upon the inspection of the wonderful collection of curiosities accumulated there by Sir THOMAS BRASSEY and his lady, the company lunched together in the tennis court. After lingering about this beautiful spot till the last moment, a rapid drive brought the company back to Hastings, and within half an hour many of them were travelling as fast as steam would allow to all parts of the kingdom.

We cannot conclude our account of this meeting without testifying to the excellence of the arrangements, which reflected the highest credit upon the Local Committee and its energetic Secretary, Mr. ROSSITER, as well as upon the General Secretaries of the Conference. Everything went well, with that absence of friction which marks the forethought and care without which the management is apt to come into greater relief. The only drawback to the meeting was the stunted dimensions which it assumed in respect to the personal attendance indispensable to the social phase of the Conference. Perhaps if the Executive will, during the coming year, turn a little of the attention which has been lately somewhat exclusively devoted to increasing the number of members to the multiplication of inducements to bring them together once a year an improvement may be attained in this direction also.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of this Society was held on Wednesday, the 6th inst. The President, Mr. J. E. Brunker, in the chair.

Present—The Vice-President (Mr. Draper), Dr. Montgomery, Dr. Collins, Sir George Owens, Dr. Tichborne, Messrs. Simpson, Wells and Grindley.

The minutes of the last meeting were read and confirmed.

Read a letter from the Chief Secretary for Ireland, dated July 7, acknowledging the receipt of a letter from the Society asking for the extension to Ireland of the Bill relative to the Sale of Patent Medicines containing Poisons, and stating that he would bring the views of the Society under the notice of the Secretary of State for the Home Department. Was ordered to be entered on the minutes.

Read a letter from Dr. Kaye, Q.C., Clerk of the Privy Council of Ireland, dated July 15, acknowledging the receipt of the resolution of the Council relative to placing the Government School of Science, South Kensington, on the list of Chemical Schools, and stating that it would be submitted to the Lord Lieutenant in Council.

A letter was read from the Honorary General Secretaries of the British Pharmaceutical Conference asking the Council to name its delegates to the meeting to be held at Hastings in August.

On the motion of Dr. Collins, seconded by Sir George Owens, Mr. Payne and Mr. Wells were appointed delegates.

A report of the Law Committee was read in which attention was called to the fact that in the city of Cork sales of cantharides and oxalic acid had taken place in improper parcels which had not the names of the vendor or poison labels affixed to them.

It recommended that the attention of the Inspector-General of Constabulary should be called to the total disregard of the Poisons Act in Ireland.

Dr. Montgomery: What is the good of our taking notice of it?

The President: The complaint comes from one of our licentiates. The police are invested with the duty of seeing that the Poisons Act is carried out. The Inspector-General, on receipt of our letter, will, I hope, issue a circular to the police on the subject.

The report was adopted.

The President said the next business was a notice of motion by Mr. W. N. Allen, in the following terms:—

> "That it be an instruction to the examiners that in subdividing the subjects for examination the minimum adopted by the Council shall be maintained in each subdivision in the same proportion."

Mr. Allen was not present but had written to say that the proposal might be discussed in his absence if the Council thought it well to do so. It arose out of the new system of marking which was tried for the first time at the last examination. Mr. Allen's idea was that the system as carried out by the examiners, although a general compliance with the rule laid down, was not so in detail. For instance, candidates had been passed who had obtained the required percentage when their answering in all the subjects was taken into account, but who fell very short of it in particular subjects. Mr. Allen's idea was that the percentage should be obtained in each separate subject.

The Vice-President said that it was desirable that there should be no misunderstanding as to what Mr. Allen meant. It was not that 40 per cent should be gained in each division, but the necessary proportion of 40 per cent., which would be about 13·5 per cent. in each division. The result would be that a candidate who fell below the mark in any one subject would be rejected.

The President mentioned an instance of one candidate who had scored over the prescribed percentage on the total of his marks, but who fell very much below the mark in botany. At the last conference of the Committee with the examiners, it was agreed that the examination in botany should be made a real one.

Dr. Montgomery remarked that pharmacy was a most important subject and that it would be very wrong to allow a candidate to make up his deficiency in it by marks in botany or chemistry.

It was decided that as Mr. Allen was not present further discussion on the subject should be postponed.

Some financial business having been disposed of, the Council adjourned.

The following is a list of successful candidates for the Licence of the Pharmaceutical Society of Ireland at the July examinations:—

Laurence Henry Elmore, Dundalk.
George Gilmore, 8, Cavendish Row, Dublin.
William Corbett Hinchy, 16, Henry Street, Dublin.
Thomas Joseph Kerrigan, Mullingar.
Edward Leyburne, 26, Clare Street Dublin.
Henry Macaulay, 23, Wall Street Belfast.
Christopher Henry Malone, 76, Rathmines Road.
Thomas Nicholson Moffitt, Newry.
Patrick Stanislaus Moriarty, Kilarney.
Horace John Neeson, Fermoy.
Timothy Maurice O'Connell, Listowel.
Weston Roberts, 2, Appian Way, Dublin.
James Walker, 92, Nelson Street, Belfast.

British Pharmaceutical Conference.

TWENTY-FIRST ANNUAL MEETING.

The Twenty-First Annual Meeting of the British Pharmaceutical Conference commenced its sittings at the Castle Hotel, Hastings, on Tuesday, August 12. Mr. John Williams, F.I.C., F.C.S., President, occupying the chair.

Before the commencement of the proceedings,

The Mayor of Hastings, Mr. Alderman THORPE, briefly welcomed the Conference to the ancient borough of which he had the honour to be chief magistrate.

Mr. J. A. BELL, Chairman of the Local Committee, begged to endorse the sentiments so heartily expressed by the Mayor. Although Hastings could not show any large chemical manufactories, it claimed to be second to no town on the south coast, and members of the pharmaceutical body in the town cordially agreed with him in welcoming the British Pharmaceutical Conference to Hastings. It was now twelve years since the Conference visited a south-coast town, and he had no doubt that wherever the Conference went it promoted that brotherly good feeling amongst pharmacists which he thought was as essential a feature as the increase of pharmaceutical knowledge, a brotherly feeling which ought to characterize all those engaged in a scientific business. He looked upon the chemist's business as being really a science, and the more deeply it was investigated, the more would this scientific character be appreciated. He was very glad to say that as a result of this visit a Local Association had been formed which he believed would be appreciated by all the resident pharmacists. The rules had all been settled, and at a recent meeting he had received the honour of being elected the first President. He could assure the members and the Conference that it would be his pleasure to promote anything which tended to improve the state of pharmacy and the welfare of the Association and the Conference.

The PRESIDENT, on behalf of the Conference, begged to thank both the Mayor and Mr. Bell for the kind manner in which they had expressed their feelings towards the Conference. He trusted this visit to

Hastings would be of benefit to the pharmacists of the town and also to the advancement of science.

Mr. F. Baden Benger, F.C.S., Hon. Sec., then read letters of apology for non-attendance from Professor Attfield, and Mr. Reynolds of Leeds; and stated that similar letters had been received from Mr. Umney, Profcssor Quinlan, Professor Bentley, Mr. C. Ekin, Professor Tichborne, Messrs. Stanford, J. R. Hill (Edinburgh), Maben (Hawick), Southall (Birmingham), Stephenson (Edinburgh), W. Hills, F. J. Hanbury and Bullock (London), Dr. Thresh (Buxton), Messrs. Rocke (Melbourne), T. S. Dymond (London), Ellinor (Sheffield), Hampson (London), Payne (Belfast), Dunstan and R. H. Davis (London), and others.

Reception of Delegates.—One of the Honorary Secretaries read a list of names of gentlemen who had been appointed by various Associations as their representatives at the Conference, but many of them were not present.

Mr. Sidney Plowman, Hon. Sec., then read the report of the Executive Committee as follows:—

Report of the Executive Committee.

Since the general meeting of the Conference last year your Committee have met on several occasions for the transaction of business, and now lay before the members an account of the work done on their behalf.

In accordance with the generally expressed wish of the Southport meeting, it was decided at a meeting of the Executive Committee, on October 3, 1883, that the two presidential addresses delivered by Professor Attfield, F.R.S., should be distributed to members of both Houses of Parliament, either directly or through gentlemen personally acquainted with members of Parliament. Further, that Messrs. Butler and Tanner, the printers of the 'Year Book,' should be empowered to supply at a fixed rate to applicants reprints of the addresses with added press notices. A Sub-Committee, consisting of the President, Professor Attfield, and the Honorary General Secretaries, was appointed to arrange details. As a result every member of both Houses of Parliament has received the two addresses, and about 10,000 copies have been supplied by Messrs. Buller and Tanner for private distribution.

In the last report of the Executive Committee, it was stated that some correspondence had taken place between the Honorary General Secretaries and certain gentlemen residing in the colonies and India, with a view to their appointment as Honorary Colonial Secretaries. Full replies having since then been received, the following appointments have been made:—

Honorary Colonial Secretaries.—For Bengal, C. N. Kernot, M.D., etc., Calcutta; Bombay, D. S. Kemp, Bombay; Canada, H. S. Evans, F.C.S., Montreal; Cape Colony and Natal, A. Walsh, Port Elizabeth; New South Wales, L. B. Bush, Bathurst; New Zealand, T. M. Wilkinson, Dunedin; South Australia, J. Parker, Adelaide; Tasmania, A. P. Miller, Hobart; Victoria, H. Shillinglaw, Melbourne; West Indies, W. C. Ross, Port of Spain.

Since their appointment a very large amount of correspondence has passed between them and the Honorary General Secretaries as to the best method by which the interests of the Conference could be promoted in the colonies.

The outcome of this was that three thousand circulars, fully setting forth the objects of the Conference, have been sent out to the Colonial Secretaries for distribution in their respective colonies, and they have been requested to stimulate research by endeavouring to obtain papers for the annual Conference meetings. Replies are not yet complete, since a comparatively short time only has elapsed since the issue of the circulars, but so far the results are most gratifying. Mr. Shillinglaw has sent the names of a number of new members, and has promised further considerable additionsto the list. As a contribution to the Conference he has sent nine decades of Baron von Mueller's 'Eucalyptographia,' presented by the Government of Victoria at the instance of Mr. C. R. Blackett, President of the Victoria Pharmacy Board, with the promise of any subsequent decades which may be published. Mr. Ross has sent a number of names from Trinidad and the West Indies. Mr. Evans has promised a large number from Canada, and Mr. Miller has sent from Tasmania a fine specimen of native bread (*Mylitta Australis*), weighing 37 lbs., a paper on which will be read at the meeting by Mr. W. Southall, F.L.S. These donations have been suitably acknowledged by the President on behalf of the Conference. All the newly-appointed Colonial Secretaries have promised to use their personal influence in furthering the objects of the Conference, and in inducing colonial pharmacists to join it.

Your Committee feel assured that by these appointments, not only will pharmacy itself be advanced, but that brotherly good feeling will be promoted, and mutual goodwill secured among English-speaking pharmacists in all parts of the empire.

For the second time in its history the Conference this year does not meet at the same time and place as the British Association.

On the first occasion the meeting was held in London, so that it was then difficult to form any judgment of what would be the result to the Conference if it ceased to meet at the same time and place as the Association. Your Committee have frequently deliberated upon this question, and now invite expressions of opinion from members, as to the desirability of continuing or abandoning the practice. An opportunity will be afforded them of stating their views on this subject at the termination of the proceedings on Wednesday.

Another new departure is made this year in the matter of the entertainment of visitors by the Local Committee. This subject has also been frequently debated and permissive resolutions passed, but at a meeting of the Executive Committee, held on December 19, 1883, the following resolution was carried:—

> "That in future the members attending the meetings of the Conference shall pay for the luncheons, etc., supplied to them during the business days of the meetings, and that if excursions be organized by the local members on the following days all railway or other fares shall be paid for by the members attending those excursions."

Your Committee have noticed with concern that the entertainment of visitors had a tendency to become more lavish year by year, and that the cost might become a serious burden not only to local pharmacists but to those residing a considerable distance from the place of meeting.

In the interest of the Conference, therefore, your Committee felt that it was necessary to do something to check the generous impulses of local committees.

Should the Conference at any time decide to abandon the practice of meeting at the same time and place as the British Association, your Committee think it possible that under the altered conditions a visit of the Conference might be welcomed by many towns in the kingdom.

Already one of the objects of the Conference has been fully attained by its proposed meeting in Hastings. At the time the invitation was sent there was no association of chemists and druggists in the borough, but since then, as a result of the visit of the Conference, one has been formed, and the usual grant of books from the Bell and Hills Fund has been made. The books are now on the table for the inspection of members.

It is with very great regret that your Committee have to announce that the Conference is about to lose the valuable services of Mr. F. Baden Benger as Honorary General Secretary and of Mr. Ekin as Treasurer. Mr. Benger has served the Conference for thirteen years and Mr. Ekin for seven years.

Your Committee feel that they cannot adequately

express in words their sense of the loss the Conference sustains by their resignation.

Five reports upon subjects for the investigation of which money grants have been made will be presented to the meeting and twenty-three papers on other subjects will be read, making a total of twenty-eight communications.

Mr. H. G. Greenish has unfortunately been prvented from completing his work on *Nerium odorum*, but hopes to present a final report on the subject at the next meeting of the Conference.

Your Committee regret that no application for a grant in aid of research has been made during the past year. They would again remind members that there is a fund for the purpose of defraying the cost of material, etc., used in the prosecution of suitable investigations, and they venture to hope that several applications for grants will be made during the forthcoming year.

Mr. Louis Siebold, F.I.C., F.C.S., was last December re-appointed Editor of the Year-Book, and the manuscript for the next issue, as far as it can be prepared, is now on the table.

Since the last general meeting of the Conference 102 members have been elected; of these 54 are home, of whom 9 are new members from Hastings, and 48 reside in the colonies and abroad.

Mr. Benger read the Financial Statement, which is printed on the next page.

The President moved the adoption of the report and accounts.

Mr. Savage (Brighton) seconded the motion.

Mr. Bottle (Dover) asked if the sale of £250 Consols was to be taken as an indication that the funds of the association were not in as good a state as in the previous year, or was it in consequence of any exceptional expenditure.

Mr. Benger (Hon. Sec.) said the expenses had been rather exceptional this year, arising in the first place from the issue of an appeal such as it was usual to send out about every few years, and which this year had been extended to the colonies, the returns from which had not yet fully come in, although £65 more had already been received this year in subscriptions than last. Secondly, there had been the additional expenditure incurred in the issuing Professor Attfield's address to members of Parliament. They had really spent about £150 more this year than last, and there was every reason to believe it would all come back.

The motion was then put and carried unanimously.

The President then delivered the following address:—

The President's Address.

It is my duty to welcome the members of the British Pharmaceutical Conference to the present meeting, which I trust will prove, like many previous ones, to be both pleasant and profitable. On this occasion the Conference assembles under somewhat unusual circumstances. Hitherto it has met year after year, with only one exception, in the same town as the British Association, and as many members of the Conference are also members of the British Association, the arrangement doubtless is a convenient one.

The more extended flight of the British Association this year to Montreal,—where I hope it will have a most successful meeting,—has, however, given the Conference an opportunity of visiting this pleasant and prosperous town of Hastings, an opportunity which might not have occurred for many years had the old order of the Conference always holding its meetings in the same town as the Association been adhered to.

The office of President of the Conference was accepted by me very reluctantly, and only in consideration of the very unusual nature of the present meeting. Whilst believing that I shall receive the indulgence of the members in my attempt to fill the office, I cannot expect to do so in an altogether satisfactory way, and when I look back at the list of names of those who have performed its duties with such distinguished ability, I must say that, even while I write, my courage seems to ooze out at the end of my pen. But I must do my best and trust to your kind forbearance in allowing for my many faults and shortcomings.

It is sometimes useful to rest and look round at what the world of science has been doing. Perhaps, therefore, you will bear with me while I allude to a few points which strike me, and which seem to have a bearing, more or less remote, upon those branches of science with which we, as a body, are more particularly connected.

A few years ago, if I had been asked what was the leading characteristic of chemical investigation, I think I should have answered, the development of our knowledge of coal tar products, and more especially concerning the many and beautiful colours derived from them. This study has not only had a most important bearing upon the technical and industrial application of scientific knowledge, but it has also led to the establishment of abstract scientific theories of the greatest importance. It is true that this great wave of thought and investigation may not appear to have influenced directly, to any great extent, the subject in which we are most nearly interested, namely, pharmacy. Still, this, like all other true knowledge, will indirectly produce an effect which may yet be found of great importance in the practice both of medicine and pharmacy. Indeed, it should not be forgotten that the very commencement of the knowledge of the coal tar colours was derived from a research undertaken by the illustrious Dr. Perkin, at the instigation of my much valued old friend, Dr. Hofmann, to build up quinine artificially. It is true the proposed result was not obtained, but another; this, however, though for a time quite neglected, has since proved most momentous. I think, therefore, we may claim that pharmacy has had a share in instigating this most important development of chemical knowledge.

Notwithstanding that Perkin's attempt to effect the synthesis of quinine was in this respect a failure, the artificial formation of the vegetable alkaloids and acids has remained a branch of research regarded by pharmacists with very great interest. Foiled in their first attempts to build up various compounds by comparatively direct combination, chemists have shown in their later researches a tendency to commence their work with careful experiments, having in view to throw light upon the rational composition of the bodies they seek to form. These researches have not been unfruitful, in that they have rendered more or less practicable the artificial production of representatives of several natural organic compounds. Moreover, although they have not up to the present time led to the complete synthesis of any vegetable alkaloid, they have yielded extremely interesting and useful information concerning the constitution of these important bodies, whilst the natural bases have been supplemented by a large number of artificially formed basic substances, some of which have already found a place in medicine. Thus Hofmann has shown that piperine, the alkaloid of pepper, can be built up from pyridine, a coal tar base, and that piperidine, one of the intermediate compounds which is also obtained with piperic acid when natural piperine is split up by potash, is probably a stepping-stone to the formation of coniine and atropine, with the former of which it is homologous. Ladenburg has reduced the number of Solanaceous mydriatic alkaloids to two,—atropine and hyoscyamine,—and shown that one is convertible into the other, and that the basic nucleus, tropine, common to both of them, is capable of combining with acids to form a whole series of new compounds, one of which, homatropine, has already been put to practical use. Turning to another important alkaloid, Grimaux has confirmed a previous suspicion that in some respects morphia behaves as an alcohol, and that by treating it for the introduction of a methyl group in the place of a

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 30, 1884.

THE HON. TREASURER IN ACCOUNT WITH THE BRITISH PHARMACEUTICAL CONFERENCE.

Dr.	£	*s.*	*d.*
1883.			
To Balance in hand	222	1	0
,, Sale of Year-Book by Publishers	21	0	0
,, Sale of Year-Book by Secretary	6	7	6
,, Advertisements, 1883 vol.	95	12	9
,, ,, 1882 vol.	15	1	6
,, ,, 1881 vol.	1	14	0
,, Subscriptions from Members	723	3	4
July. To Dividend on £250 Consols	3	13	5
1884.			
Jan. ,, ,, ,, ,,	3	13	5
June. To Sale of £250 Consols	248	15	0
	£1341	1	11

Cr.	£	*s.*	*d*
By Expenses connected with Year-Book:—			
Printing, binding, and distributing . . . £504 4 6			
Editor's Salary . . . 150 0 0			
Advertising and Publishers' charges 31 1 6			
Foreign Journals . . 5 4 6			
	690	10	6
,, Secretary's Salary (Mr. Princep) . .	100	0	0
,, Printing and Stationery . . .	85	0	8
,, Sundry Expenses	7	7	5
,, Postage	98	3	2
,, Addressing Circulars	5	1	0
,, Expenses of Southport Meeting . .	9	17	0
,, Secretary's Expenses (Mr. Princep), Southport Meeting	6	0	0
,, Grant to Mr. Elborne	2	2	0
,, ,, Messrs. Dunstan and Short .	5	0	0
,, ,, Messrs. Dunstan and Ransom .	5	0	0
,, Cheque Book	0	4	2
,, Balance at Bank . . £323 10 6			
,, Cash in Secretary's hands 3 5 6			
	326	16	6
	£1341	1	11

	£	*s.*	*d.*
Assets July 1st, 1884, Cash in hand . . .	326	16	0

THE BELL AND HILLS FUND.

Dr.	£	*s.*	*d.*
1883. To Balance in hand	25	16	10
July. To Dividend on £350 Consols . .	5	2	10
1884.			
Jan. ,, ,, ,, . .	5	2	10
	£36	2	6

Cr.	£	*s.*	*d.*
By purchase of Books for Southport . .	10	5	9
,, Balance at Bank	25	16	9
	£36	2	6

	£	*s.*	*d.*
Assets July 1st, 1834 { Cash in hand	25	16	9
{ Consols (stock)	350	0	0

Audited and found correct { T. H. SYKES, Southport. / ARTHUR J. JOSEPH, St. Leonards-on-Sea. } *Auditors.*

hydroxyl group morphia can be readily converted into codeia. The identity of the substitution product with codeia, was at first questioned by the celebrated German chemist, Hesse, but Grimaux's statement was confirmed by a member of this Conference, Mr. D. B. Dott, of Edinburgh, and it is now admitted that codeia is a monomethyl ether of morphia, Hesse having been temporarily misled by the formation of some dimethylmorphia. In a similar way, it has been shown that caffeine may be obtained from theobromine and theobromine from xanthine by the introduction of successive methyl groups, whilst xanthine itself is derivable from guanine, a constituent of guano. Even while I write it is announced that the complete synthesis of xanthine has been effected by Gautier, so that if these various statements are correct we appear to be within sight of the production of caffeine artificially.

Chinoline is a product of coal tar, but was originally produced by the destructive distillation of cinchonine, quinine, etc. The two products although nearly identical can, however, be distinguished by careful comparison. Chinoline is a powerful base, and one of its salts, the tartrate, has been largely employed in medicine. Chinoline has doubtless great activity, and in some of its characters it appears to coincide in medicinal activity to quinine, but in a different, or we might say, uncontrollable manner. Still more lately the so-called "kairine," which is really a salt (the hydrochlorate) of a methyl substitution compound of chinoline and appears to possess very considerable activity, has been employed in fever cases to reduce the temperature of the patient. But there appears to be some evidence that the power of the remedy is gradually changed or reduced by keeping, and that after a time—at present undetermined—its action is very different from that of the freshly prepared article. This would be, if correct, a serious consideration, and would tend to prove that the constitution of this artificially produced substance is very different in its nature to that of an alkaloid produced by natural means.

Chemical investigators have also been devoting much attention to explosive substances. Now as most of these are nitro substitution compounds, it is hardly surprising to find that among them are substances that have proved capable of acting as potent remedies in the hands of medical men, when manipulated and brought into convenient form for administration by pharmaceutical skill. Need I say I allude to the introduction of such bodies as nitroglycerine and nitrite of amyl into the field of practical medicinal agents?

These instances will suffice to show the nature of the information that has been gleaned and some of the contributions that have been made to our store of available medicinal agents whilst working out the synthesis of organic compounds and other great chemical problems. It will be of at least equal interest to devote a few moments to the consideration of some of the artificially formed substances that have been put forward as representatives of natural compounds. I may say at once that, in my opinion, the results hitherto obtained are not of a very conclusive character; in fact, I think there is some reason to doubt if any of the products produced by artificial means are actually identical with the natural products. Even those bodies produced artificially, like benzoic or salicylic acid, which chemically approach so nearly to the bodies produced naturally as to be hardly distinguishable from them, appear to have not quite the same action medicinally. This is, of course, a very serious question for medical men, and in a subordinate way for pharmacists.

For instance, it is stated that benzoic acid and its salts, produced artificially from naphthaline, are not medicinally active, like the acid produced from gum. This may be due to the fact of the latter acid containing a large percentage of cinnamic acid, and it has been argued that it owes its medicinal activity to that acid. But cinnamic acid itself has been made artificially for some time, and this also is said to be inert. Further, the therapeutical action of resin benzoic acid has also been attributed to the empyreumatic compound which sublimes with the acid and imparts colour to it, but this too appears to have been disproved by some recent experiments in Germany.

Salicylic acid, again, I have myself some knowledge and experience of, and I find that in the opinion of many medical men there is an essential difference in the medicinal activity of the natural acid produced from wintergreen oil and of that produced artificially from carbolic acid. It is possible that this difference may be due to some trace of impurity still retained by the artificial acid, though I think I ought to mention that a very great improvement has taken place in the appearance and quality of the artificial acid since, in 1878, I pointed out the great difference which then existed between the acid made from carbolic acid and that produced from wintergreen oil.

Within the last few months my attention has been drawn to a new source of salicylic acid, namely, the oil of sweet birch (*Betula lenta*). This oil appears to be sometimes used as an adulterant of the true gaultheria oil. It seems to contain a large percentage of methyl salicylic acid, but without the peculiar terpene so characteristic of the true wintergreen oil. There are also other plants that have been reported to yield similar oils, and these appear worthy of more attention than they have yet received. For instance, about thirteen years since Mr. Broughton reported that he had examined an essential oil obtained from an Indian plant (*Andromeda Leschenaultii*), and found it to be almost identical with oil of wintergreen. So plentiful is this plant in the hill districts that Mr. Broughton seems to have seriously contemplated the utilization of the essential oil in the economical manufacture of carbolic acid by the decomposition of the methylsalicylic acid contained in it. Shortly afterwards, Dr. De Vrij stated that whilst in Java he had obtained an almost identical oil from the leaves of *Gaultheria punctata* and *G. leucocarpa*. With respect to sweet birch oil, some experiments have already been made in the preparation of salicylic acid from it, but at present I am not in a position to say whether there is any difference between the medicinal activity of the product and of that obtained from oil of wintergreen. I am, however, endeavouring to obtain a supply of undoubtedly genuine birch oil, with which I hope to be able to decide whether there is any real difference between samples of salicylic acid produced from the two oils, or whether such difference as I have observed is simply due to some impurity in the oil I have been working with. I am also anxious to obtain samples of the oils from the sources mentioned by Mr. Broughton and Dr. De Vrij, as these would enable me to carry out a more complete series of comparative experiments.

Great and important as the question may be as to the possibility of the artificial production of organic principles which shall be chemically and medicinally identical with those formed naturally, it is only part of a still larger subject—the life-history of the plant or animal organism. This possesses great interest for all, and it must be admitted that a great deal has been done during the last few years to throw light upon this department of knowledge. But as, in order to constitute anything like conclusive evidence, numerous and extensive observations are indispensable, so the number of patient, painstaking, and at the same time accurate observers, cannot be too great. As marking an important step in knowledge, I may allude to the researches lately instituted to determine the rate of absorption of water by a plant, which appear to prove that that rate is very much in proportion to the dryness of the surrounding atmosphere, and is regulated by the amount of evaporation from the surface of the leaves.

Another series of observations, made by Professor

Sachs, also appear to me to be of very great interest, not only to the professed botanist, but very probably to the pharmacist. Professor Sachs has been engaged in the study of the rate of formation and disappearance of starch in the leaves of growing plants, and as the process for conducting these researches, unlike those for determining the amount of absorption of water by the living plant, is easy to carry out, and requires little or no apparatus, I think I may venture to describe it more in detail, as perhaps some present, especially those who reside in country districts, might be inclined to assist in this research by their own observations.

The leaf to be examined is first plunged into boiling water for about ten minutes, then taken out and digested in alcohol for about the same time (I find methylated spirit answers perfectly well). This treatment extracts the whole of the colouring matter (chlorophyll) and leaves the leaf perfectly white. The leaf is now placed in an alcoholic solution of iodine, and the presence or absence of starch is demonstrated in a few minutes. The absorption of iodine commences at the edges, and soon colours the leaf blue-black if much starch be present, or brown if the quantity of starch be but small. The venation of the leaf appears as a pale network upon a dark ground, rendering it a very beautiful object; but all my efforts to preserve the specimen beyond a few hours have hitherto failed.

The curious and interesting information obtained from these researches is that the amount of starch present in the leaf of any given plant varies considerably under different circumstances. In direct sunshine, and under otherwise favourable circumstances, starch is formed very rapidly; but it generally disappears entirely during the night, so that a leaf collected in the evening will prove full of starch, while another leaf of the same plant collected before sunrise will not show a trace.

It is also an interesting fact, but one we should quite anticipate, that if the air surrounding the plant is deprived of its carbonic acid by means of caustic soda, no production of starch takes place, even in direct sunshine and with warmth and moisture that would under other conditions be sufficient.

Again, the gradual increase in the quantity of starch produced during the day and under specified conditions is a matter of great interest, as it would point to certain times and conditions when the plant would probably be more vigorous, and the activity of its medicinal principles greater than at some other time. We already recognize the importance of plants intended for medicinal use being collected at certain periods of growth, but it is possible that we have still something to learn upon this subject.

I fear in these later days pharmacists have rather gone backward than forward in such knowledge. The apothecary, herbalist, or simpler of two hundred years ago appears to have taken many and—to our modern way of thinking—some very foolish precautions in this matter. We now, I fear, practically take none, but rather leave everything to the knowledge and care of those who grow and supply such medicinal plants in a wholesale way. Perhaps the fact that some of our indigenous plants, once held in high repute, are now practically cast on one side, may be due in some degree to the difference in the care and knowledge with which such plants have been collected. My learned predecessor in this chair, Professor Attfield, suggested, I think, that pharmacists should grow their own plants. I would not go as far as that, as I fear the results would even then not be satisfactory, either in a medicinal or pharmaceutical sense; still, if by any means we could add to our knowledge of the best mode of cultivation or collection of medicinal plants we should be doing a service both to the public and ourselves.

By what means light effects the transformation of carbonic acid and water into starch is not known, although it is known that chlorophyll plays an important part in the reaction. But the influence of light in producing chemical change and combination is at once one of the most wonderful and inexplicable of phenomena. Photography has popularized this subject, though I need not venture to dilate upon that most fascinating art, for we constantly find the influence of light in chemical reactions of still nearer interest to the pharmacist.

A few years ago a demand arose for dichloride of ethidene. Unfortunately, this demand came in the winter, when little light—sunlight especially—was available in England. The compound is produced by the combination of chlorine with chloride of ethyl, both in the gaseous state, but the action can only be started or maintained under the influence of sunlight. Consequently on dark, cloudy, or foggy days it has been found impossible to continue the manufacture of the compound. This is one of many instances which might be mentioned in which light proves itself to be of active and positive use to the chemist. And it is possible that in the future many other reactions will be conducted under its influence. Last, but not least, light is the great disinfectant.

Probably the most striking chemical, or rather I suppose I should say physical, results that have been obtained in recent years have been those following upon the many and startling experiments on gases conducted under immense pressure and at very low temperatures. In these experiments advantage is taken of the fact that certain liquids boil at very low temperatures, especially when *in vacuo*, and obviously in becoming converted into vapour take up heat from surrounding matter to a large extent. In fact, working under these conditions with liquid carbonic anhydride and liquid ethylene (the chief illuminating agent of ordinary coal gas), such temperatures as $-80°$ to $-115°$ C., or even $-140°$ C. have been arrived at, and it is asserted that as low as $-200°$ C. has been reached by allowing liquid oxygen to boil *in vacuo*. In a lecture lately delivered at the Royal Institution, Professor Dewar exhibited alcohol in a gelatinous condition, and bisulphide of carbon in a solid state, and was even able to show to a few of those present liquid oxygen. Even in the short interval since then the manipulation has been very much simplified and brought within the range of an ordinary laboratory operation. M. Cailletet has announced that marsh gas, under only a slight pressure, if submitted to the refrigerating influence of ethylene boiling at ordinary atmospheric pressure, is converted into a liquid that in vaporizing produces a degree of cold in which oxygen is at once liquefied, without the necessity for elaborate apparatus for submitting it to pressure.

It is with almost a feeling of regret that we hear of the results of these extraordinary experiments. Probably we have all agreed in a general way that at some temperature or under some pressure the so-called permanent gases would become either liquids or even solids; but it is almost startling to find the thing done, and our old refractory friends brought down to the level of ordinary matter. It is also interesting to mark how near the normal temperature appears to be to that temperature at which such a gas as oxygen becomes a liquid or even a solid; for *minus* 200° C. seems but a little way down, if we compare it with *plus* 200° C. Even at *plus* 2000° C., which is a temperature we can certainly reach, many of our most familiar elements and compounds would not liquefy, while as to the temperature at which, say, iron or platinum becomes gaseous, we must turn to the astronomer, who will tell us of temperatures in the sun many hundred times higher than the highest point we can ever expect to reach by our ordinary means upon the surface of this earth. Considering this great distance between the extremes of known temperatures, it does strike one with something like astonishment to remember that life, both vegetable and animal, is pretty nearly limited to the comparatively small range of temperature within which albumen and protein and such compounds generally are capable of existing without coagulation or change of physical properties,—say between

zero and 75° C.,—certainly not far beyond these limits. I say it does somewhat startle one to find that we are existing as it were nearly at the bottom of the heat range, and that matter, even in the form of such gases as oxygen and nitrogen—in other words the very atmosphere we breathe—would by a reduction of temperature, comparatively small as compared with the high temperatures known to exist, become solid matter. However much we may have been prepared to admit the possibility of such a state of things, we are hardly prepared to find it so close to our elbows.

This liquefaction and solidification of some of the gases is likely to prove of great practical use, both to pharmacists and chemists and to the public generally. Anhydrous sulphurous acid gas readily condenses under a pressure of about three atmospheres to a liquid, and in this state can be put up into syphon-vases to be drawn upon as required. This method is, I understand, coming into considerable use with brewers and others, who use the gas for checking fermentation. To the pharmacist it will probably prove a very handy and useful mode of keeping the acid, rather than in the form of a solution, in which condition sulphurous acid is liable to oxidize and spoil, whilst solutions, either in water or alcohol, can be readily prepared from the liquid acid as required.

Carbonic anhydride, also in the liquid state, is now being supplied in strong cylinders, and is coming into use, I understand, for charging beer, wine, etc., with carbonic acid gas. Further, it is said that in Berlin the snow-like solid carbonic acid, with which most here are familiar, is brought into a more compact form by placing it in cylinders and subjecting it to great pressure. Under this treatment the acid becomes hard and brittle, something like marble in appearance, in which condition it might be handed round at a dinner-table, and each guest chipping off a portion could effectually, not only cool his wine, but at the same time charge it with the agreeable carbonic acid. I do not know if the price at which the liquid acid can be produced can be brought down to suit the makers of aërated waters; if so, it may prove a very convenient and useful invention to many pharmacists, who only require to make small quantities of lithia, potash or other medicated waters.

Although somewhat beyond the usual range of subjects immediately interesting to pharmacists, we cannot but recognize the vast importance of the researches and enormous advances science is making in the detection of the probable causes of zymotic diseases. To Pasteur in France, to Koch in Germany, and to Klein and others in England, much is due, and we look for a further development of their researches with profound interest. It is not by any means improbable that one of the ultimate results of these researches may be to make great changes in the application of remedies to the classes of disease alluded to. And pharmacists may be called upon to undertake the preparation of remedies possibly of a character at present little thought of, at any rate in England. For instance, on the Continent, oxygen is now administered as a gas in certain forms of disease. Already, too, the preparation of vaccine for sale to farmers as a prophylactic against *charbon*, or splenic fever, in sheep is carried out on commercial principles in France, and it is quite possible that a vaccine against hydrophobia may soon be in the market. There is no doubt also that the introduction of new disinfecting and antiseptic agents is likely to receive greater attention in the future than it has ever in the past, important as the subject is already acknowledged to be. I imagine a great future is still in store for the production and utilization of articles of this nature, a subject which must be of the greatest interest to the pharmacist as well as to the medical man and sanitary inspector.

The last year has also been distinguished by a development of peculiar interest to pharmacists. I allude to the production of several pharmacopœias. Indeed, it is curious, but not unnatural, that in the great centres of civilization throughout the world the same feeling appears to have prevailed, namely, that the national pharmacopœias of the various States required revision—that the old ones were unsatisfactory and not up to the mark required by modern medical science.

New pharmacopœias have accordingly appeared in America, Germany and France, and it is no secret that England is to be favoured with a new pharmacopœia shortly. It is not my intention to enter into any critical examination of these works. I rather allude to them as proving the great and living interest taken at the present time in matters pharmaceutical. Excellent articles, with copious extracts, have appeared in the *Pharmaceutical Journal* and elsewhere, giving a good idea of the nature of the contents of these works to those who have not had time or opportunity of studying the originals. As these works emanate from countries very distinct in social and intellectual conditions, so we find in them marked differences in the treatment and manipulation of drugs and chemicals. Probably from our own peculiar standpoint we can find fault with some details in all these works, but taking them as a whole I think there can be no question that a great advance is shown. I trust that when our new national pharmacopœia appears we shall be able to congratulate the compilers of that work in a similar way; but we naturally feel anxious, and should be glad if we had some guarantee that the practical part will be as completely done, as there is no doubt the theoretical part is sure to be. Speaking generally of the three works referred to, the American Pharmacopœia might be described as too diffuse, the German as too scientific, and the French as too special; but there is no doubt that from each many valuable hints and processes can be obtained. The question of the admission of new remedies into national pharmacopœias, and the exclusion of old remedies that have become obsolete, requires great caution and consideration. It is quite proper that a new and useful remedy should be added as soon as possible to a national pharmacopœia, so as to define its strength, properties, etc. But experience teaches us that many remedies introduced fail from some cause to justify their inclusion in such a work, and it therefore follows that the lapse of sufficient time must be permitted before the final position of a new remedy can be settled. There is also a difficulty in removing an old remedy, which ought to be borne in mind. The influence of a pharmacopœia is not only felt in its own country, but frequently far away also, as many of the more distant centres and colonies accept the articles authorized in a European pharmacopœia, and continue to use them long after their popularity has waned at home. I was struck a short time back by a remark by the Editor of the *Pharmaceutical Journal* respecting the retention of kermes mineral in the new French Codex. It is true that that particular preparation is but seldom prescribed now, I suppose I may say in France, certainly very seldom in England, Still, it is in large demand in South America, where the French Codex is accepted as an authority—and I am sorry to say the British Pharmacopœia is not. Bearing in mind also that a pharmacopœia is often appealed to in courts of law, it is of great importance that both additions and withdrawals should be effected with great discretion, as frequently questions may arise which will give rise to great trouble and confusion in the legal mind.

This leads me to allude to what is really a most important function of the modern pharmacopœia. I allude to the tests for the quality of drugs and the purity of chemicals which it may contain. It is admitted by all that the greatest care and attention should be given to matters of this kind, but some judgment and discretion must be shown. If the description of a drug be based upon a rare and almost unique specimen, it is obvious that it will be impossible to maintain such a standard of quality in the ordinary course of pharmaceutical practice. So, too, if the tests given for a chemical preparation are so refined as not to make allowance for obvious and practi-

cally non-important impurities, great and unnecessary increase of cost might have to be incurred in the preparation of such articles without a corresponding advantage to the public. I was pleased to find that this point had not been lost sight of in the new French Codex, where impurity and adulteration are separated and treated apart. To give one instance, cream of tartar is described as containing tartrate of lime as an impurity; but silica alum, etc., are mentioned as adulterants and not to be permitted. This, I think, is a sensible and proper plan. All natural cream of tartar must contain a certain percentage of the lime salt. If it is required free from lime salt it must be prepared from tartaric acid, and the product must of necessity be far more costly, although no better for medicinal purposes. Under such a definition as that in the Codex no magistrate or justice would convict a chemist for selling a natural cream of tartar as an adulterated article; whereas the adoption of strict chemical tests only, without any allusion to natural impurities as such, might lead to inconveniences such as, I am afraid, have before now resulted from the British Pharmacopœia not having recognized facts, although distinctly describing the ordinary natural article as the officinal preparation.

This brings me naturally to the question of the proper system under which a new British Pharmacopœia should be compiled, to which subject permit me to claim your attention for a short time. That a new pharmacopœia is required is agreed upon by all, and we understand that the General Medical Council, which is the body at present entrusted by law with the responsibility of the production of the work, is engaged in, or has given directions for, its production in due course. I may also remind you that we, as pharmacists, have put forward a very strong claim to be officially recognized and to be permitted to take our share in the responsibilities of the production of this most important work. We claim the position on many grounds, and it has appeared to me unaccountable that our claim has not been cordially responded to, both by the Government and the medical authorities. One, and I would say a foremost ground for our making this claim is that we are a branch (although admittedly a humble one) of the great profession of healing, and that our special branch of that profession is exactly that concerned in the production of a National Pharmacopœia. Not only is this our special province, but we claim it also on account of our special knowledge. I do believe and assert that pharmacists as a body know more about the best modes—or I may say the practical niceties—involved in the preparation of medicines than any other body of men in the country. And I would even go so far as to affirm that they are better acquainted with the science of the subject, as far, at any rate, as the practical application of science to pharmacy is concerned. Again, we claim the position of being officially recognized in the production of a National Pharmacopœia, and most strongly insist upon this as a right, upon the ground that the National Pharmacopœia is a work of legal authority; that we are bound by its provisions and are liable to suffer pains and penalties unless we follow the details given as to quality, practice and purity of the drugs, preparations and chemicals. We have a right to be officially consulted upon these matters of detail, so as, if possible, to avoid the introduction of vexatious or impossible formulæ or conditions. We claim further that we ought to have a voice in framing the laws under which we are to be judged; for let it not be forgotten that the Pharmacopœia is in effect a code of law, which must be obeyed, even if wrong or unreasonable, or the pharmacist must expect to lose both in pocket and reputation.

I have said that the non-recognition of our claim to the position to which we consider we are entitled in this matter has appeared to me unaccountable. I fear I must withdraw that expression, or at any rate attempt to account for the unaccountable. I have had many opportunities of speaking upon this subject to influential men of various positions, both in the medical and the general world, and the general expression of opinion has been one of surprise that pharmacists are not already entrusted with a share in the production of the Pharmacopœia. Among the many members of the medical profession to whom I have spoken, I have not found one who professed to see any reason why we should not be entrusted with our proper share of the work, whilst many have expressed a strong opinion that we ought to take an active part in it. As for members of the general public, they are simply bewildered if they think upon the matter at all; but as far as my experience has gone, all, without exception, have been favourable to the claim we make. Still it is noteworthy that we do not get what we ask, and it is pretty evident to my mind, at least, that notwithstanding all that has been done to move the Government in our favour, some greater influence has succeeded in neutralizing our endeavours to obtain the assistance of the Government in establishing by law our reasonable claims, and I am forced to the conclusion that it is an unwillingness in certain quarters to recognize pharmacists, even in a *quasi*-professional sense, that lies at the root of this matter. We are tradesmen, and it appears that therefore, notwithstanding any amount of education, training or examination to which we may submit, we are not to receive the recognition which is strictly and justly our due. If this is indeed the explanation of the matter, I can only say it increases my wonder. In no other country does the keeping of an open shop prevent a pharmacist from taking his proper place, side by side with the medical practitioner, and in fact becoming his essential adjunct. In most countries, indeed, the pharmacist (or apothecary) is the only legally recognized dispenser of medicine, the practice of pharmacy being jealously restricted to those who have made a special study of the subject, and not permitted to be exercised by those only possessing the very general knowledge acquired by students who have to devote the greatest amount of their time to other and more special branches of medical knowledge.

I cannot conclude without alluding to the subject of an International Pharmacopœia. More than once in years gone by this subject has been brought forward at the meetings of the International Pharmaceutical Congress, and especially on the occasion when we had the honour and great pleasure of receiving the Congress in London. It is also announced that the subject will again form a principal topic of discussion at the forthcoming meeting of the Congress in Brussels.

At the Congress in London all were agreed that a great necessity existed for the creation or compilation of such a work; but it must be admitted that very little progress appears yet to have been made towards settling the very important question as to its extent and scope. I am aware that an influential Committee was appointed to take these matters into consideration, and to report to the next meeting of the Congress. We shall all, I am sure, wait with great interest the result at which this Committee may arrive, and hope that a solution will be found of some of the important, and not easily reconcilable, questions which are involved in the attempt. I trust, however, the Committee will bear in mind that by attempting too much at once it will court failure, whilst by limiting the number and nature of the articles proposed to be included in the work to a few special articles, a much greater chance of a general acceptance of the scheme will be secured. We might then hope to see, even in our time, a general agreement arrived at between all nations as to the strength standards of such articles as opium preparations, hydrocyanic acid and such compounds, which are of universal use in medicine, and the uniformity in the strength of which, as a protection to the general safety of the public, needs no argument. Years ago, this necessity was not nearly so real; but in these days, when the public generally travel so continuously, and to such various distant countries,

uniformity is not only desirable, but absolutely necessary, if we would escape the certainty of distressing accidents continually occurring. Although, therefore, the question of the settlement of an international pharmacopœia in a spirit of wisdom and sound sense is, to us in England, second in importance to that of our own national work, it still must possess the highest interest for all who look upon pharmacy as a profession instituted not entirely for the benefit of those who practise it, but also for the good of the community.

Mr. F. ROSSITER (Hastings) moved a hearty vote of thanks to the President for the admirable and instructive address he had delivered. Mr. Williams's great reputation as an accomplished pharmacist, and his great knowledge of scientific preparations, had led all to look forward with more than ordinary interest to this address, an expectation which had not been disappointed. From the beginning to the end they must all have been interested in the very highest degree, not only with reference to the numerous preparations which had been mentioned, but even more so perhaps in that part which referred to their relation to the medical profession, which might easily give rise to a very interesting discussion. He would not attempt, however, to enter upon any such discussion, which might probably run to much greater length than there was time for, seeing the number of papers which appeared on the programme.

Mr. A. JOSEPHS (St. Leonards) seconded the motion, which was carried unanimously, and briefly acknowledged by the President.

The reading of papers was then proceeded with, the first two being—

A REPORT ON ENGLISH RHUBARB.

BY WILLIAM ELBORNE,

Assistant Lecturer on Materia Medica and Pharmacy, Owens College.

In a paper* read before the School of Pharmacy Students' Association, with a view of classification, I divided the numerous varieties of commercial rhubarbs into two groups, viz.:—

Asiatic Rhubarbs.

Chinese	Russian, Muscovy or Turkey. Canton or East Indian. Batavian or Dutch trimmed.	yielded by	*Rheum palmatum* var. *Tanguticum* and *Rheum officinale*?
Siberian		,,	*R. rhaponticum.*
Himalayan (large)		,,	*R. Emodi.*
,, (small)		,,	*R. Webbianum.*
Bucharian		,,	*R. undulatum.*

European.

English		,,	*R. rhaponticum.* *R. officinale.*
French		,,	*R. rhaponticum.* *R. compactum.* *R. undulatum.*
Austrian (Moravian)		,,	*R. rhaponticum.*

As well known, the bulk of rhubarb imported into this country is of Chinese origin and reputed to be afforded by the two species *Rheum officinale* and *R. palmatum* var. *Tanguticum*.

The cultivation of rhubarb in this country for the sake of the root, dates back to the year 1608; and up to 1876, English-grown rhubarb appears to have been the produce of *R. rhaponticum* and probably of *R. undulatum*. At the present day however, in addition to these varieties we have a further supply afforded by *R. officinale*, derived from the plant introduced into this country in 1867, by the late Daniel Hanbury, as a source of the true Asiatic rhubarb.

* *Pharm. Journ.* [3], xiii., 1046.

The object of this and my succeeding paper will be to discuss the nature and value of this drug as compared with its congener *R. rhaponticum* and Asiatic rhubarb as at present imported.

Rheum officinale,* Baillon.

Of the English-grown drug there are two varieties, known as the "ordinary cultivated" and the "highly cultivated" root.

Botanical Description.—*R. officinale* is a perennial noble plant, resembling *R. rhaponticum* and *R. undulatum*, but of larger size. It differs from these latter species (which yield the common garden rhubarb) in the following particulars:—The leaves spring from a distinct crown, rising several inches above the surface of the ground, and have sub-cylindrical petioles, which, as well as the veins of the under surface of the lamina, are covered with a pubescence of short erect hairs. The lamina, the outline of which is orbicular, cordate at the base, is shortly five to seven lobed, with the lobes coarsely and irregularly dentate; it attains 4 to 4½ feet in length and rather more in breadth. The best distinguishing character of *R. officinale* is the strong development of the sympodium or rootstock, a large portion of which projects conically above the ground, being provided with a few lateral roots about the thickness of the finger. Also the first epidermis of the radical portion is remarkable for the bright brownish-red colour, the roots of the other species being yellowish-brown.

History.†—For authentic specimens of this plant, known to be a source of the Asiatic drug, we are indebted to French missionaries, who, commisioned by M. Dabry, French Consul at Hankow, in 1867, obtained leaves and cuttings from the south-eastern part of Tibet. These specimens were transmitted to Dr. Soubeiran and grown in the garden of the School of Pharmacy at Paris, and subsequently described by Baillon.‡ From this source offsets of the root came into the possession of Hanbury and Flückiger, who, in 1872, paid a visit to the rhubarb fields of Mr. Rufus Usher, at Bodicote in Oxfordshire. In correspondence with Mr. Usher he writes: "In the spring of the following year, at the resquest of Professor Flückiger, Mr. Hanbury very kindly sent me an offset from a root in his possession, from which he had succeded in growing a very fine root in time to produce a dried specimen for the Philadelphia Exhibition in 1876. By the exhibition of this specimen Mr. Usher was awarded a medal 'for success in cultivating rhubarb for medicinal purposes and creating a quality that compared favourably with the best roots.'" Professor Fluckiger has also expressed the opinion that the root of *R. officinale* grown at Bodicote agrees in every way with the Chinese drug except in the somewhat finer colour of the latter.

Cultivation.—It is a fact, I believe well established, that by cultivation, the roots of certain medicinal plants, such as aconite and valerian, lose much of their medicinal activity, due probably to the extra development of inert tissues at the expense of others. About twelve months ago, having occasion to examine a sample of "highly cultivated" English-grown *R. officinale*, from the excessive development of the white parenchymatous tissue the fracture displayed, I expressed this view to Mr. Usher as applying to the sample in question. In reply, Mr. Usher fully endorsed the opinion, remarking that he invariably found that the slower the growth and the longer the time the roots were allowed to mature, the more condensed they became and yielded richer and darker tints in the prepared root. In explanation he also further stated that being very desirous of raising and multiplying as rapidly as possible the small plant presented to him by Flückiger and Hanbury, he resorted by the application of stimulants to a very highly forced cultivation. Having

* Figured *Bot. Mag.*, 1874, t. 6135.
† *Pharm. Journ.*, [3], vi., 861.
‡ *Pharm. Journ.*, [3], iii., 301.

succeeded in raising a large number of plants, Mr. Usher, aware of the defects of this mode of cultivation, established another plantation of *R. officinale*, grown on a more natural system, known as "ordinary cultivation." The former practice not having been abandoned, for want of experimental evidence as to the respective pharmaceutical value of the two products, we consequently meet in the market with two different forms of the same drug.

English-grown rhubarb plants are propagated from the offsets or lateral shoots of four year old plants, set at distances of from six to eight feet apart and left to grow for from five to seven years, when the roots are ready for collection.

By "ordinary cultivation" is understood the method of planting the young offsets on an average soil, two years after the last manuring. "High cultivation" consists in growing the plants on the richest soil possible, with copious dressings of liquid and solid manure. The cultivation of *R. rhaponticum* comes under the ordinary method. At Bodicote about forty acres are under cultivation.

Collection.—The roots are dug up in the dry weather between July and September, and having been peeled and sliced into pieces known in the trade as "flats" and "rounds," the rootlets furnishing "small rounds" or "sticks," they are first exposed to a current of air in an open bedding for several days, and the drying completed by means of artificial heat at 90° F. This mode applies to all varieties of English rhubarb. In the last stages of drying, *R. officinale* will not bear so high a temperature as *R. rhaponticum* by ten degrees.

Description.—Both varieties of *R. officinale* occur in flat concavo-convex pieces weighing from three to four ounces each. The outer convex surface displays a number of deep, longitudinal furrows, the effect of drying, and is traversed throughout with a longitudinal ramification of conspicuous veins, producing altogether a different appearance to the fine net-veined markings displayed by some samples of the present commercial East Indian rhubarb. In the centre of the concave surface of each piece a small hole has been drilled half-way through for the purpose of ascertaining the soundness of the pieces internally, and in this feature it corresponds with the now extinct Russian rhubarb. The pieces show the same stellate markings as the East Indian, especially on the inner surface, much more in some than in others. While the "ordinary" and "highly cultivated" bear a great resemblance to each other externally, the fracture of the former shows a more compact structure, and the internal veins a deeper colour; the odour is stronger, and the colour of the powdered root is much darker coloured than the highly cultivated. Neither varieties present the red appearance displayed by the fracture of *R. rhaponticum* or the imported drug, nor do they yield the same bright yellow powder of the latter. They are distinctly gritty when chewed. On fracture the comparatively black colour of the veins imbedded in a whitish parenchymatous tissue readily distinguishes the cultivated varieties of *R. officinale* from *R. rhaponticum.*

Microscopical Structure.—For the following description I am indebted to my friend Mr. W. Kirkby, who has been kind enough to prepare and examine a number of sections for the purpose:—"The outer layer immediately beneath the epidermal portion consists of about eight rows of tabular parenchyma extended tangentially. Within this is a broad zone of loose parenchyma containing starch, into which the medullary rays extend about half way across. Next comes the dark cambial line made up of several rows of closely compacted oblong parenchyma exhibiting the radial arrangement of the medullary rays. Between the medullary rays are seen groups of large reticulated vessels, consisting of from one to five vessels, arranged for the most part in a radial manner. They are surrounded by unthickened elongated parenchyma. The colouring matters are found in the medullary rays. The centre of the root shows no definite arrangement of the tissues, being a mass of parenchymatous cells interspersed irregularly by the medullary rays. The whole root is loaded with starch. The granules are generally compound. The larger single granules have a diameter of about 20 micromillimetres. The hilum is generally, but only slightly, eccentric, and is seen as a small black dot. When mounted in Canada balsam the black cross is distinctly visible with polarized light. Raphides are fairly numerous, and vary considerably in size. In the loose tissue of the root, just within the zone of radial medullary rays, are found scattered the stars so characteristic of Chinese rhubarb; these exhibit all the anatomical features of the root. *R. officinale* differs chiefly from Chinese rhubarb in that it contains more starch, and from *R. rhaponticum* in the vessels and cells of the medullary rays being larger and the arrangement of the various tissues being less distinct and regular."

Chemical Composition.—The active properties of rhubarb are considered to be chiefly due to cathartic acid, chrysophan, tannin, and the resinous substances emodin, erythroretin and phæoretin. The following are the results arrived at in my examination of English rhubarb in reference to these constituents:—

	R. officinale ord. cult.	R. officinale highly cult.	R. rhaponticum.	East Indian Rhubarb.	
Cathartic acid . . .	3·5	3·2	3·3	4·5	per cent.
Chrysophan and Tannin	14·3	11·7	12·5	11·7	per cent.
Resinous substances . .	2·6	2·0	3·4	4·6	per cent.
Mucilage	6·5	4·8	4·1	4·0	per cent.

From the above it will be seen that the composition of English cultivated rhubarbs compares favourably with that of the Asiatic drug and that the ordinary cultivated *R. officinale* is superior to the highly cultivated variety.

Commerce.—The total production of English rhubarb may be estimated at 12,000 pounds annually, from 3000 to 4000 pounds of this quantity being exported. Messrs. Rufus Usher and Sons, to whom I am indebted for much valuable information in the compilation of this paper, are at present the sole producers.

In conclusion, while English rhubarbs apparently yield very good tinctures, a report from the medical profession on their therapeutic qualities can alone determine their legitimate use in pharmacy.

Analyses of Rhubarb.

BY WILLIAM ELLBORNE,

Assistant-Lecturer on Materia Medica and Pharmacy, Owens College.

The following analyses have been undertaken with the view of ascertaining the composition and relative value of English-grown rhubarbs. So far as time has permitted me to pursue the subject I have followed the method of analysis adopted by Professor Dragendorff* and Mr. H. G. Greenish.†

The following samples were taken:—

I. *Rheum officinale.*—Flats, English-grown rhubarb, "ordinary cultivation" (five years' growth), from Mr. Rufus Usher.

II. *Rheum officinale.*—Flats, English-grown rhubarb, "highly cultivated" (six years' growth). Mr. Rufus Usher.

III. *Rheum rhaponticum.*—Flats, English-grown rhubarb, a good commercial specimen.

IV. *East Indian Rhubarb.*—Flats, a fine specimen, displaying the net-veined markings, from the Materia Medica Museum, Owens College.

V. *Russian Rhubarb.*—An old authentic specimen, displaying the net-veined markings, from the Materia Medica Museum, Owens College.

The quantity of root necessary for analysis was well

* *Pharm. Journ.*, [3], viii., 826.

† *Pharm. Journ.*, [3], ix., 933.

powdered and passed through a fine sieve containing forty-four meshes to the linear inch.

I. *Estimation of Moisture.*—Upon drying at a temperature of 110° C. the loss of moisture was as follows :—

No. 1. 0·857 gram lost 0·052 = 6·06 per cent.
No. 2. 1·01 „ 0·08 = 7·9 „
No. 3. 1·073 „ 0·06 = 5·57 „
No. 4. 1·185 „ 0·065 = 5·4 „
No. 5. 1·205 „ 0·152 = 12·6 „

II. *Estimation of Ash.*—The residue from the above estimation incinerated in a platinum dish yielded the following grey ash :—

No. 1. 0·08 gram = 9·33 per cent.
No. 2. 0·05 „ = 4·9 „
No. 3. 0·85 „ = 7·9 „
No. 4. 0·11 „ = 9·28 „
No. 5. 0·08 „ = 6·63 „

III. *Aqueous Extract.*—Five grams of the powdered root were macerated forty-eight hours with so much distilled water that the mixture measured 100 c.c., frequently shaken, and finally allowed to stand. The volume of the root-sediment then occupied :—

No. 1. . . . . 45 c.c.
No. 2. . . . . 37 c.c.
No. 3. . . . . 35 c.c.
No. 4. . . . . 45 c.c.
No. 5. . . . . 50 c.c.

The respective supernatant liquids, exhibiting marked differences in colour (Nos. 1 and 5 being more the colour of port wine as compared with Nos. 2, 3, 4, which were sherry coloured), upon filtration yielded between 50 and 60 c.c. of aqueous extract, which was used in experiments described in paragraphs IV. to VIII. The marc in the cylinder was then washed out with sufficient water to bring the product up to 100 c.c., and the wash water filtered through the same filter. The solid residue was then thrown upon a piece of fine muslin placed within the filter, allowed to drain, and the whole finally dried at 30° C. This was used in Experiment IX.

IV. *Combustible Substances Soluble in Water.*—Upon evaporating to dryness 5 c.c. of the aqueous extract (·25 gram root) in a tared platinum dish, weighing, incinerating and again weighing, the following numbers represent the combustible matter present :—

No. 1. 0·085 less 0·007 ash = 31·2 per cent.
„ 2. 0·085 „ 0·001 „ = 32·4 „
„ 3. 0·076 „ 0·005 „ = 28·4 „
„ 4. 0·07 „ 0·005 „ = 26·0 „
„ 5. 0·095 „ 0·006 „ = 35·6 „

V. *Mucilaginous Matter.*—Twenty c.c. of the aqueous extract (1 gram of the powder) was mixed with 60 c.c. of 95 per cent. alcohol, allowed to stand for forty-eight hours, and the precipitate collected on a tared filter, washed with alcohol, dried and weighed.

No. 1 yielded 0·065 = 6·5 per cent.
„ 2 „ 0·048 = 4·8 „
„ 3 „ 0·041 = 4·1 „
„ 4 „ 0·040 = 4·0 „
„ 5 „ 0·055 = 5·5 „

VI. *Cathartic Acid.*—The filtrate and alcoholic washings from No. V. were rapidly evaporated on a water-bath until the residue measured 5 c.c. This was mixed with 40 c.c. of absolute alcohol, the precipitated cathartic acid collected on a tared filter, washed with alcohol, dried and weighed.

No. 1 yielded ·035 gram precipitate = 3·5 per cent.
„ 2 „ ·032 „ „ = 3·2 „
„ 3 „ ·033 „ „ = 3·3 „
„ 4 „ ·045 „ „ = 4·5 „
„ 5 „ ·032 „ „ = 3·2 „

VII. *Tannin and Chrysophan.*—To another 20 c.c. of the aqueous extract solution of acetate of copper was added in slight excess; the brown precipitate was collected on a tared filter, rapidly washed with a small quantity of water, dried and weighed. The precipitate was then ignited with ammonium nitrate and the amount of cupric oxide residue deducted; the difference represented tannin and chrysophan.

No. 1 yielded 0·15 gram ppt. less 0·007 CuO = 14·3 p. c.
„ 2 „ 0·14 „ „ „ 0·023 „ = 11·7 „
„ 3 „ 0·145 „ „ „ 0·02 „ = 12·5 „
„ 4 „ 0·12 „ „ „ 0·013 „ = 11·7 „
„ 5 „ 0·12 „ „ „ 0·02 „ = 11·0 „

VIII. *Organic Acids.*—The filtrate from Experiment VII. was precipitated with neutral acetate of lead, the precipitate collected, washed, dried, and weighed, incinerated, and again weighed.

No. 1. 0·055 less 0·022 PbO = 3·3 per cent.
„ 2. 0·037 „ 0·005 „ = 2·2 „
„ 3. 0·03 „ 0·015 „ = 1·5 „
„ 4. 0·047 „ 0·017 „ = 3·0 „
„ 5. 0·065 „ 0·02 „ = 4·5 „

IX. *Resinous Substances Soluble in Alcohol.*—The residue of the root after extraction with water was digested in absolute alcohol for six days, filtered through the filter used in Experiment III., and the residue washed with absolute alcohol. The filtrate and washings, evaporated to dryness and weighed, yielded the following amounts of residue (emodin, erythroretin, phæoretin and other resinous substances).

No. 1. 0·13 gram = 2·6 per cent.
„ 2. 0·1 „ = 2·0 „
„ 3. 0·17 „ = 3·4 „
„ 4. 0·23 „ = 4·6 „
„ 5. 0·26 „ = 5·2 „

X. One gram of the rhubarb was macerated in 30 c.c. of petroleum ether for six days. It was then filtered, evaporated to dryness and weighed. Each sample left a residue which examined under the microscope consisted of flat rhombic crystals and fat, which gave a purple colour on addition of caustic soda [chrysophanic acid ?].

No. 1. ·004 = 0·4 per cent.
„ 2. ·003 = 0·3 „
„ 3. ·002 = 0·2 „
„ 4. ·007 = 0·7 „
„ 5. ·015 = 1·5

XI. Two grams of rhubarb extracted with absolute alcohol, yielded the following extract :—

No. 1. 0·43 = 21·5 per cent.
„ 2. 0·28 = 14·0 „
„ 3. 0·39 = 19·5 „
„ 4. 0·49 = 24·5 „
„ 5. 0·485 = 24·25 „

	R. officinale ordinary cultivation.	R. officinale high cultivation.	R. rhaponticum.	East Indian rhubarb	Russian rhubarb.
	P. c.	P. c.	P. c.	P. c.	P. c.
Moisture	6·06	7·9	5·57	5·4	12·6
Ash	9·33	4·9	7·9	9·28	6·63
Mucilage (soluble in water)	6·5	4·8	4·1	4·0	5·5
Cathartic acid . . .	3·5	3·2	3·3	4·5	3·2
Tannin & chrysophan	14·3	11·7	12·5	11·7	11·0
Organic acids . . .	3·3	2·2	1·5	3·0	4·5
Resinous substances soluble in alcohol .	2·6	2·0	3·4	4·6	5·2
Fat and free chrysophanic acid soluble in petroleum ether	0·4	0·3	0·2	0·7	1·5

A vote of thanks was passed to Mr. Elborne for the papers.

Mr. Holmes said these papers must have cost Mr. Elborne a great deal of labour, and there were one or two points on which he should like to have a little further information. When he visited Banbury some years since, Mr. Usher was only just thinking of introducing *Rheum officinale* root into commerce, but it appeared that it was now being sent into the market in two different forms, one grown under ordinary conditions and the other more highly cultivated, which was said not to be so valu-

able. It became important, therefore, to learn if these two could be readily distinguished. It seemed that the fresh *Rheum officinale* root could be distinguished from the *rhaponticum* root by the dark red veins, and he should be glad to know if the veins remained equally dark in the dried root. It was pretty well known that no Russian rhubarb had been imported since 1860, and, therefore, the specimen Mr. Elborne had examined was of some interest. It had been presented to him (Mr. Holmes) some years ago by Dr. Leared, and as there were good specimens in the museum in Bloomsbury Square, and none in that at Owens College, he sent it there. The extra amount of moisture discovered in it was probably owing to Dr. Leared having kept it for some years in a drawer which was not very dry, and where it would probably absorb moisture. With regard to the deductions drawn from the analyses, he thought, although Mr. Elborne had done a great deal of very valuable work, that the conclusions could hardly be yet considered as decisive, owing to the remarkable differences which were known to exist in different samples of the same variety, some being very light and spongy, whilst others were hard and resinous, the latter being commonly used for cutting up into the so-called Russian rhubarb. These samples would probably differ in the quantity of extractive matter, and, therefore, a great number of specimens should be examined to get a fair average.

Mr. PLOWMAN reminded the Conference that the grant was originally made for the purpose of determining the comparative value of commercial rhubarbs, to which the titles of these papers did not exactly correspond. A great number of valuble facts had been submitted, but as the grant was made in order to determine the comparative value of commercial rhubarbs, he should like to ask Mr. Elborne if he had deduced any conclusions from the facts he had ascertained as to which kind of rhubarb would be best for medicinal purposes and which had the most therapeutical value. He hardly supposed that he would be able to draw such deductions himself, but he might have formed some opinion.

Mr. MARTINDALE asked if Mr. Elborne considered the cathartic acid in rhubarb, which he regarded as the main medicinal agent, as being identical with the cathartic acid in senna. He looked upon chrysophan as being an important constituent in the medicinal activity of rhubarb and was surprised that Mr. Elborne had not determined its quantity. He thought that benzol would be a better solvent than petroleum ether for extracting this substance from either goa powder or rhubarb, better even than dealing with the residue of an aqueous extraction. Tannin also, was, no doubt, an important constituent. Rhubarb was a very complex body therapeutically, and it was by no means understood which constituent was of chief importance. It was still largely used, though not so much so as it was twenty years ago.

Mr. BORLAND thought one point mentioned by Mr. Elborne was worthy of a little further explanation. He stated that a difference of 10° F. in the application of artificial heat made a great difference on the two varieties, and he should like to know what were the exact effects produced by so small an increment of temperature.

Mr. GREENISH suggested that as Mr. Elborne did not take that which was considered by Professor Dragendorff as the active principle, he should make aqueous extracts from each of these varieties, and let their therapeutic value be determined to ascertain whether the results correspond with those he arrived at, from a chemical point of view.

Mr. DOTT asked whether the chrysophan of rhubarb was identical with the chrysarobin of goa powder.

Mr. SCHACHT hoped Mr. Elborne would answer all the questions on the physics, chemistry or cultivation of rhubarb, but that he would not attempt to deal with the therapeutical side of the question. There was a certain class of investigations which legitimately belonged to them, and there was another class which they were not competent to perform properly.

Mr. ELBORNE, in reply to Mr. Schacht's remarks, drew attention to a passage at the conclusion of his paper in which he referred to the necessity of the therapeutical activity of these different rhubarbs being determined by medical authorities.

Mr. ELBORNE said it was his privilege to live amongst a number of eminent medical men, and he had no doubt he should be able to prevail upon some of them to take up this subject. They were already investigating the action of some drugs in the Manchester Infirmary, and he had prepared tinctures of all these rhubarbs, which he believed Dr. Leech was going to experiment with. In reply to Mr. Holmes, he might say that the distinction between the *R. officinale* and *R. rhaponticum* was quite obvious. The fracture of *R. officinale*, whether highly cultivated or not, was quite different from that of *R. rhaponticum*, the former being comparatively black while the latter was red. He could illustrate that by the fresh specimens on the table; and the difference was quite as obvious in the dried drug. The difference between the two varieties of *R. officinale* was not so obvious, but it only required a careful fracture to be made of these two rhubarbs, when it would be found that the highly cultivated was much more spongy and had more white parenchymatous tissue than the ordinary kind, which took longer to grow. He should be pleased to forward any gentleman who was interested in the matter specimens of each of these varieties. He was certainly surprised to find so much moisture in the Russian root, and no doubt it was accounted for as Mr. Holmes had suggested. He had originally intended to make complete analyses of each variety, but time did not admit of this, and therefore he thought he had better determine somewhat roughly the more important constituents as they were considered. For that purpose he treated them each in a similar way, by the method followed by Dragendorff and Greenish. All he did was to treat them with certain solvents; he had not time to separate the chrysophan from the tannin. In reply to Mr. Martindale, he should say that the cathartic acid in rhubarb was identical with that found in senna. He would add that each precipitate exhibited a somewhat albuminous appearance, but each slightly differing from the others. Rhubarb did not contain much chrysophanic acid in the free state, but chrysophan, which was no doubt closely allied to it. With regard to the extraction of this body, he thought petroleum ether preferable to benzol, because it had a much lower boiling point. With regard to the difference of temperature, he might say that the drying of rhubarb was a very difficult matter, and it was found that the *R. officinale* more readily became rotten if subjected to the same temperature as the *R. rhaponticum* could stand very well. If overheated it seemed to undergo disintegration of tissue, and so decomposition took place. The drying was carried on at a temperature of about 95° F. He could not answer Mr. Dott's question whether chrysophan was identical with chrysarobin.

The PRESIDENT said this question of drying rhubarb reminded him of a new process which had been lately adopted for drying gunpowder by means of anhydrous chloride of calcium. It was dried much more efficiently and safely in this way, and it struck him that rhubarb might be dried in the same way; the only thing required was to see that the chloride of calcium was perfectly dry; it was very cheap, being a mere refuse product.

Mr. ELBORNE added that the process of drying was very difficult, the temperature he had mentioned having to be maintained for about six weeks. He had suggested to Mr. Usher that if cut in slices, as was done with other succulent roots, the process would be much facilitated, and it could not affect the pharmaceutical value of the article, but it would not of course have the elegant appearance which the ordinary pieces of root had.

(*To be continued.*)

"THE TIMES" ON THE CONFERENCE MEETING AND PHARMACOPŒIA REVISION.

The following is an extract from an editorial article on the address delivered by Mr. Williams before the British Pharmaceutical Conference, which appeared in the *Times* on Wednesday last :—

"The Pharmaceutical Conference opened its twenty-first Annual Meeting on Tuesday, August 12, at Hastings, and the learned address of the President, Mr. John Williams, will have upon students of science the bracing effect usual with such discourses. Unlike clergymen, politicians and philosophers, scientists of the foremost rank are always hopeful; we never hear from them that the world is going back, and they show no apprehension of having to take leaps in the dark as they advance with a spirited but safe tread into new regions of discovery. Mr. Williams does, indeed, remark incidentally that the pharmacists of these latter days have rather receded than progressed in their care about the collecting of plants used for medicinal purposes. The apothecary, herbalist, and simpler of two hundred years ago took many apparently foolish precautions in gathering his herbs at certain periods of their growth; but now no precautions are taken at all. The chemist trusts entirely to the knowledge and care of those who grow the plants and supply them wholesale, and this may explain why certain herbs, once held in high repute, are now cast aside as worthless. Saving this regretful admission and a complaint, upon which we shall touch presently, as to the unsatisfactory status allowed officially to pharmacists as compared with doctors, there is nothing in the President's speech but what is as encouraging to read as it must have been gratifying to deliver. . . . . These circumstances lend to the position of the pharmacist in our day an ever-swelling importance. We go to the doctor to be cured of illness, but we have recourse to the chemist for preventives against ill-health; and while this makes it necessary that the chemist should be a man in whom full confidence can be reposed, it also suggests that the status which he may claim from his attainments should be ungrudgingly recognized.

"Arguing from these considerations, the President of the Pharmaceutical Conference urges that, in the preparation of the new Pharmacopœia which is about to be issued, the chemist should be officially consulted. The General Medical Council is the body which has hitherto been intrusted by law with the responsibility of producing this work, but the Pharmacopœia is at once the chemist's manual and his code of laws, and it is contended that he should have a voice in framing it, if only on the ground that he knows more about the provisions it should contain than anybody else. Mr. Williams remarks that in no country except this does the keeping of an open shop prevent the pharmacist from taking his proper place side by side with the medical practitioner. Most countries, in fact, recognize the pharmacist as the only proper dispenser of medicine, the practice of pharmacy being jealously restricted to those who have made a special study of the subject, and prohibited to doctors 'who have had to devote the greatest amount of their time to other branches of medical knowledge.' To this it must be answered that before we can assign to chemists a monopoly in the practice of pharmacy, the public confidence in them as a body must rest on guarantees of longer standing than those now existing. The Act which requires that a chemist shall be a person of indisputable qualifications has not been in operation long enough to eliminate from the trade all those who entered it before the passing of the Act. Nor are we sufficiently remote from the time when the chemist was simply a tradesman or speculator and nothing else. However, it is certainly a pity that professional etiquette should stand in the way of admitting pharmacists to help in editing the Pharmacopœia, since it must be acknowledged that they know more about the practical niceties involved in the preparation of medicines than any other body of men. Mr. Williams is not sanguine as to the chances of an International Pharmacopœia, so often talked of, being issued within a reasonable time, for it seems that little progress has as yet been made in this work, which would introduce uniformity into the definition, treatment and manipulation of drugs. But his remarks on the newest foreign pharmacopœias, and on the hints which the compilers of the forthcoming English edition should draw from them, are full of interest. The American work is said to be too diffuse, the German too scientific, and the French Codex too special. As the influence of a pharmacopœia is felt not only in the country where it is published but frequently far away, and as many distant centres and colonies accept the articles in a European pharmacopœia and continue to use them long after their popularity has waned at home, it becomes a matter of importance that a work of this description should be prepared with the utmost forethought. Both the admission of new remedies and the exclusion of old ones require great consideration, all the more so as a pharmacopœia is often appealed to in the courts of law. It must fix the tests for the quality of drugs and the purity of chemicals, discriminate between impurities and adulterations, in fact form the great law book of medical practice and the guide in some cases to medico-criminal jurisprudence. It is not too much to ask for a book so far-reaching in its operations that it should have the benefit of the best experience in its composition.

"Mr. Williams did not allude in his address to the Patent Medicine Stamp Act, the working of which was denounced in a series of resolutions at the recent meeting of the British Medical Association at Belfast. We published on Tuesday letters from two correspondents who expatiate feelingly on the grievances which, not chemists alone, but the whole public, suffer from this Stamp Act. The grounds of complaint are, firstly, that it is unjust to impose a tax on medicines; next, that the Act as lately interpreted in law courts promises greatly to impede the importation and use, especially in hospital practice, of medicines of foreign origin; and lastly, that the Government label issued under the Act 'is taken advantage of by patent medicine manufacturers to give the appearance of Government endorsement to their productions, and lead the public to suppose that the properties of the medicine are sanctioned by authority.' These various propositions hardly admit of dispute. If a medicine be good, it is assuredly unjust to raise its price by a tax; while if it be deleterious, or if it does not possess the properties which its makers advertise, it is wrong that it should bear a Government label which may mislead the buyer. There can be no doubt that many patent medicines are purchased under the assumption that the Government label is a sort of Hall mark guaranteeing the purity of the compounds sold under it. But the label really guarantees nothing. It may cover baneful drugs and lend a *quasi* official sanction to imposture. Passed originally as a means of raising revenue for the war against Napoleon, the Stamp Act is a survival of days when the Government were more exercised in finding taxable matter than concerned about principles of political economy; and one of our correspondents stigmatizes it as a contravention of the policy of free trade, a hindrance to commercial enterprise, and an obstruction to scientific inquiry. These hard words are, perhaps, not undeserved. In its origin doubtless the Act was partly intended to stop the traffic in cheap unlicensed drugs which once could be hawked in the streets, but it has long outgrown its uses in this respect."

COMMUNICATIONS. LETTERS, etc., have been received from Messrs. Clarke, Frazer, Ager, Lankester, Saul, Bessant, Forster.

SYDNEY, NEW SOUTH WALES,

JUNE 11, 1884.

ENO'S FRUIT SALT IN EQUITY.

Before his Honor the PRIMARY JUDGE.

ENO *v.* DAVIES AND ANOTHER.

Mr. J. E. Solomon, Q.C., and Dr. Donovan, instructed by Mr. De Lissa, for the plaintiff; Mr. Owen, Q.C., and Mr. Nash, instructed by Messrs. Bull and Bull, for the defendants.

This is a suit instituted by James Crossley Eno, of Pomeroy Street, Hatcham, Surrey, England, to have the defendants, William Davies and James Channon, trading as William Davies and Co., Goulburn, and Harbour Street, Sydney, ordered to take a certificate of registration for a trade mark called "The Australian Fruit Salt" off the file at the Registrar General's office, and also to have them restrained by perpetual injunction from using the title to any other commodity. The plaintiff claimed that the trade mark was an infringement of his own, viz., Eno's Fruit Salt, Fruit Saline, and Fruit Powder. Consequential damages were also claimed. The defendant's mark was registered in this Colony two months before plaintiff's.

His Honour, in giving judgment, said he had no doubt that the case came within the principle laid down in the cases which had been cited wherein the Court enjoined a defendant not to continue the use of his trade mark. Although there were some important points of distinction in the goods, still there were points of resemblance which were calculated to induce persons to believe that they were obtaining the plaintiff's, when in reality they were buying the defendant's. The bottles were about the same weight and shape, and a purchaser of the defendant's would hardly know he had not got Eno's until he opened the package. Looking at the two bottles, he thought purchasers were exceedingly likely to be misled, because a man was not supposed to carry his last bottle with him in order to see that he was getting the same article, and persons buying were not supposed to be always suspicious that frauds were being practised upon them. He considered the term "fruit salt" sufficiently distinctive to be in itself a trade mark, and it had been proved in evidence that people generally asked for it by that name. The resemblance in the bottles and in the printing on the wrappers was so close that he regretted he could not say that it resulted from accident or was consistent with innocence. The distinctions seemed to have been carefully studied in order to escape, if possible, the results of imitation. The defendants had brought out their article just when the plaintiff's had taken a gigantic jump in public estimation, and had acted in such a way as to induce him to believe that they intended to lead the public to think they were buying plaintiff's goods when they were served with theirs. There was fraud which tradespeople unfortunately did not think much of, but which the Court always regarded with the greatest reprehension. He did not think the argument as to the second section of the Act had very much to do with the case. When the defendant registered he must have obviously known that Eno's Fruit Salt was in the market. He had no more right to register than he had to sell. He did not think the Act in any way interfered with the powers which the Court of Equity possessed before it became law. The Act had only been passed to afford a speedier and readier remedy to those who registered under it. The seventh section evidently contemplated that such a suit as the present one should be taken by a person who considered he had been wronged, as the plaintiff had been. He would grant the injunction in the terms of the prayer, restraining the defendants from using the trade mark, on the ground that it was an infringement on the plaintiff's prior and exclusive claim. He would order them to take such proper and necessary steps as were possible to take the certificate of registration off the file, but if a power greater than theirs stood in the way in the matter, they would be relieved from attachment. He did not see how he could compel the Registrar-General, who was an officer appointed by Parliament, to do a certain thing, to cancel the certificate, especially as he had not been made a party to the suit. The certificate, however, could be delivered up, because it was part of the subject matter of the suit. He would order the defendants to pay costs up to the hearing, and would direct an issue as to consequential damages to be tried before a special jury of four in the Jury Court on a day to be named. He would make the question of costs of these further proceedings dependent upon the result, because it might be that he would not give plaintiff his costs if he did not recover a substantial amount.

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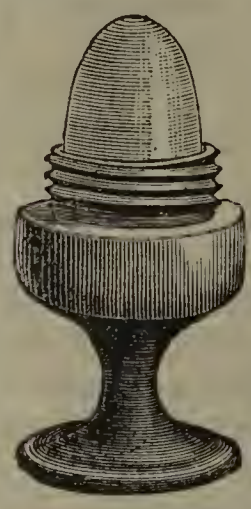

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WINTER SESSION commences on the 27th October.

PRELIMINARY EXAMINATION, 27th and 28th October.

Prospectuses and full particulars on application.

Classes open to Amateurs.

The London Hospital and Medical

COLLEGE, Mile End, E.—The SESSION 1884-5 will commence on Wednesday, October 1st, 1884, when the Prizes for the past Session and the Nursing Probationers' Prizes will be distributed at 8 p.m., by the Right Hon. the Lord Mayor, M.P., accompanied by the Lady Mayoress. There will be a Conversazione, to which all past and present students are invited. FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30 and £20, will be offered for competition at the end of September to new students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All Resident and other Hospital appointments are free, and the holders of all the Resident appointments are provided with rooms and board entirely free of expense. The Resident appointments consist of Five House-Physiciancies, Five House-Surgeoncies, and One Accoucheurship; Two Dressers and Two Maternity Pupils also reside in the Hospital. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, District, East London, and South Eastern Railways have stations within a minute's walk of the Hospital and College.

For prospectus and particulars apply personally or by letter to Mile End, E. MUNRO SCOTT, Warden.

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DEGREES IN MEDICINE AND SURGERY.

Full particulars as to Courses of Study, Examinations, &c., may be obtained from the Registrar. An Entrance Examination in Arts (recognized by the General Medical Council) will be held in the Owens College on Monday, October 6th, and following days. Candidates will be required to pay a fee of £1, and to furnish the Registrar with a certificate from their last instructor or some other suitable person, stating that they are proper persons to be admitted to the Examination. Attendance to receive fees and to enter students for the Examinations on September 30th, October 1st and 2nd, from 10 a.m. to 1 p.m., and from 2 to 4 p.m.

A. T. BENTLEY, M.A., Registrar.

OWENS COLLEGE, MANCHESTER.

Prospectuses of the Pharmaceutical Courses in the Session 1884-5 will be forwarded on application.

J. HOLME NICHOLSON, Registrar.

St. Thomas's Hospital Medical School,

ALBERT EMBANKMENT, LONDON, S.E.

The WINTER SESSION of 1884-5 will commence on OCTOBER 1st, when an Introductory Address will be delivered by Sir J. Risdon Bennett, M.D., F.R.S., at 3 p.m.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle.

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STUDENTS who really desire to be thoroughly and carefully prepared, so as to ENSURE SUCCESS, should study under the **NO PASS, NO PAY, POSTAL SYSTEM.** For particulars enclose stamped envelope to TUTOR, care of Mr. Filtness, Rotherfield. Reference to pupils who passed the last examination. Metric System Notes, 1s. The inflexions of each word in Cæsar, 1s.

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SCHOOL OF MEDICINE.

The FIRST SESSION will commence in October next.

The objects aimed at in this School may be shortly stated as follows:—

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2. To give instruction in Natural Science.
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Prospectuses, &c., may be obtained from the Secretary of the School, West London Hospital, Hammersmith, W.; or from Mr. C. B. Keetley, 20, Princes Street, Hanover Square, W.

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ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 47 out of 51 Pupils passed the last Examinations.

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Laboratory and School Buildings:

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At the Examinations held in London this month, 5 Major candidates from this School presented themselves. The following 4 passed:—

Mr. CLOWER	Mr. HANSON
,, GRADIDGE	,, SALMON

17 Minor candidates were recommended to present themselves for examination. The following 13 passed:—

Mr. ADAMS	Mr. GRAY
,, ASTON	,, JAMES
,, BAYLEY	,, JOINT
,, GIBBONS	,, HUGHES
,, FISHER	,, STEVENS
,, FLOWER	,, TIMM

Mr. WATSON

MR. JUDD'S CLASSES

MINOR AND PRELIMINARY.

The Morning Class for the October Exam. will begin on the 1st Monday in September.

Resident and non-resident pupils can be received at any time for the October Minor and Preliminary.

Evening Classes from 7.30 to 10 o'clock. *Advanced* Minor on Monday and Thursday. *Intermediate and Elementary* on Wednesday and Friday. Preliminary Class on Tuesday, at 7 p.m. Preliminary Classes also on Tuesday and Friday afternoons, at 2.30. Successes are scored from these classes at each Minor and Preliminary Exam.

For terms, &c., call (preferred) or write, with stamp, to

Mr. H. JUDD,

West Central School of Pharmacy,

31, REGENT SQUARE, W.C.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

FOURTEENTH SESSION, 1883-4.

Entries now begun for the term commencing Sept. next.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

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WHAT IS IT THAT contributes greatly to success?
A good memory.

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TRINITY SQUARE, BOROUGH, LONDON, S.E.

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FEES:—

To the October Examination	...	£5 5s.
To the December ,,	... ...	£8 8s.
Six Months' Course	... ...	£10 10s.
Twelve Months' Course	... ...	£15 15s.

At the Pharmaceutical Examinations held last month, the following 29 Students of the Westminster College were successful in passing the MINOR Examination:—

*Mr. A. BANKS	Mr. R. M. LEWIS
* ,, W. BARKER	* ,, C. O. MORRISON
* ,, T. N. BROOKE	,, G. MOOR
,, B. H. BUTLER	,, G. NEALE
,, W. CLARKE	,, J. NEWTON
,, C. ELLIS	,, F. ROOKLEDGE
,, H. C. GLANVILLE	,, F. T. SANDERS
,, W. H. GODSLAND	,, B. SMITH
* ,, E. E. HALL	,, J. STURDY
,, J. H. HOPPER	* ,, W. SUMNER
,, A. J. HEMSTEAD	,, T. E. TAYLOR
* ,, J. HULLAND	,, A. WALDRON,
* ,, S. HUGGINS	,, H. P. WITHERS
* ,, G. JACQUES	,, H. E. YOUNG
* ,, J. K. JONES	

PRELIMINARY.

*Mr. R. COLWILL | *Mr. N. COUVE
Mr. A. T. RILEY.
* Resident Students.

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2.—That letters addressed to initials or to fictitious names at a Post Office are not taken in, but are at once sent back to the writers by the Post Office Authorities.
3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers.

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36, Oxford Street, Liverpool.

Principal: J. S. WARD, Ph. Ch., M.P.S.
(*Prize Medallist and South Kensington Prizeman.*)

The next session will commence on Monday, September 1st, with Two Courses of Lectures, one for the October candidates, and the other a full course extending over until the December Examination.

Three out of Four of those who have passed from this School at the recent Examinations have been successful on their first attempt.

A new Prospectus, with full particulars of the School premises, curriculum, fees and testimonials, will be forwarded on application.

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AS SENIOR or MANAGER. Out-door. Age 27. Qualified. 12 years' experience. Good references. W. H. DAWSON, Phœnix House, Spilsby, Lincolnshire.

ENGAGEMENTS WANTED.

APPRENTICE.—A youth, well educated, age 16, requires a situation with a Chemist in the South of England. Circumstances will not permit of a premium. Address, E. J. H., Chestnut House, St. Leonard's Rd., Horsham.

JUNIOR (out-door), in a brisk ready money Retail. Had 5 years' experience. Would take part day engagement. Excellent references. OMEGA, 9, Nunhead Grove, Peckham, S.E.

AS JUNIOR, DISPENSER to Surgeon, in London. Time for study. Age 25. Height 5ft. 7in. 5 years' experience. Moderate salary. Good references. Disengaged. JUNIOR, 37, Vestry Rd., Camberwell, S.E.

LONDON or suburbs preferred. Minor qualification. 6 years' experience. Good references. Age 22. Height 5ft. 8in. Disengaged September. ZETA, W. Preston, Chemist, Dalton-in-Furness.

QUALIFIED gentleman seeks out-door situation or Management of Branch. Has had sole charge. Has had great experience. ASSOCIATE, 31, Chapel St., Edgware Rd., W.

BY a Licentiate of the Pharmaceutical Society of Ireland.—As COMPOUNDER in respectable business house in city or suburbs. Small salary at first. W. R., 2, The Appian Way, Dublin.

AS JUNIOR.—Age 21. 5 years' experience in good Retail. Would not object to Wholesale. Manchester or suburbs preferred. LEWIS WILLIAMS, Mr. Bushby, Chemist, Stockport Rd., Manchester.

AS JUNIOR, or DISPENSER to a Surgeon. Good Dispensing and Retail experience. Age 21½. Now disengaged. ANON, 123, Kings Rd., Reading.

AS JUNIOR.—Experience, first-class Retail and Dispensing. Age 20. Height 6ft. Good references. Apply, stating usual particulars, to H. D. J., Cambrian House, Newcastle Emlyn.

AS ASSISTANT.—Out-door. Age 25 years. 9 years' experience in London and country. Can Extract Teeth. H. J., 1, Preston Rd., Brighton.

AS Junior ASSISTANT, in a good class business, chiefly Dispensing, preferred. Age 23. Address, with particulars, B. B., Mr. Drabble, Long Bennington, Grantham.

ADVERTISER, holding a permanent engagement, desires a post as LOCUM TENENS in a seaside town. Good experience in all branches. MEDICUS, 4, Walton Pl., East Molesey, Surrey.

ASSISTANT in a good Pharmacy, where whole of time would be devoted to Dispensing. Apothec. Hall. Experience, not salary object. T. A., 34, Aketon Rd., Castleford, Yorks.

AS JUNIOR.—3½ years' good experience. Abstainer. London or suburbs. Excellent references. Disengaged. Z., 9, High St., Rochester.

AS Temporary ASSISTANT or MANAGER. Age 27. Minor qualification. T. ASCOTT, Broad Clyst, Exeter.

AS ASSISTANT, in a good class business. Town or country. Age 23. Good references. W. J. PIDDUCK, 7, Scarisbrick New Rd., Southport.

AS JUNIOR, in Dispensing and Retail business. Age 21. 5 years' experience. Town or country. Please state salary, &c., to ALPHA, 20, Chalcot Cres., Primrose Hill, N.W.

WHOLESALE.—At Wet or Dry Counter. 4 years' experience. Age 20. Or as CLERK in the office of a good firm. Disengaged. CHEMICUS, 70, Burton Rd., Brixton.

ASSISTANTS WANTED.

MANAGER, single, in-doors, in a good class country and Agricultural trade. Must be qualified. Easy hours. No Sunday trade. Send carte, age, salary, and references, to the Trustees of the late E. RAINEY, Pharmaceutical Chemist, Spilsby, Lincolnshire.

SEASIDE.—Junior ASSISTANT, in a good class Retail and Dispensing establishment. A comfortable home and time for recreation. Apply, with usual particulars, to T. W. PARRIS (late Vizer), Church Rd., West Brighton.

IN September.—A Junior ASSISTANT, for a country business. Apply, stating age, height, salary and references, to WAIN & ILLSLEY, Chemists, Ripley, Derby.

DR. SARGENT, Dorrell Pl., Brixton Railway Station, London, requires an ASSISTANT, able to Prescribe, to Extract Teeth, to Dispense and attend Chemist's Retail. Hours, 8 a.m. till 10 p.m. No Sunday work whatever. Apply, stating salary required, in addition to board and lodging, with references and when disengaged. Time for study.

A JUNIOR ASSISTANT, out-door, for a Mixed country business. Must be an accurate Dispenser. Apply, stating experience and salary required, to COX & ROBINSON, Stony Stratford.

W. H. RICHARDSON, Pharmaceutical Chemist, Dudley, requires a competent ASSISTANT for a Dispensing and Family business. In-door. Good references indispensable.

AN ASSISTANT, for the Mixed trade. About 23 years of age. Must be able to Extract Teeth, Prescribe occasionally, and make himself generally useful. No Sunday duty. Abstainer or member of a Christian church preferred. Address, stating salary required and addresses of two last situations, J. WATTS, Chemist, Attercliffe, Sheffield.

BY the 15th September.—An ASSISTANT, in a first-class Retail and Dispensing business, 7 miles from town. Not under 23 years of age. Apply, stating age, salary required, and reference from last employer, to M., care of Messrs. Barron, Squire & Co., Bush Lane, Cannon St., E.C.

NIGHT Work.—Gentleman, well up in Dispensing, offered comfortable home and small salary for undertaking any Dispensing required during the night. Very suitable for a medical student or gentleman otherwise engaged during the day. Address, Mr. MAIR, Chemist, Bonnington, Edinburgh.

AN ASSISTANT, accustomed to a good Dispensing business, of steady, sober habits. State age, height and usual particulars, with carte, to E. H. HASSELBY, 1, Eversfield Pl., St. Leonards.

MR. PHILLIPS, Pharmaceutical Chemist, Broadway, Ealing, W., has a vacancy for a qualified gentlemanly ASSISTANT, age not less than 23, who has been accustomed to a good class Dispensing business. Personal application desirable, but applications may be made by letter, in which case carte must be enclosed, which will be returned.

IMMEDIATELY.—Trustworthy gentleman wishing to study for examination, might attend lectures three times weekly until 1 p.m. Salary £20 (indoor), or with assistance in studies, £12. (Penny tram from Wills' or Winter's.) Age preferred—25 to 35. References and photo (returned) to PHOSPHORUS, care of Messrs. Sanger, 489, Oxford St., W.

IMMEDIATELY.—In Town. A competent but not necessarily qualified man. One not afraid of work and that can produce thoroughly good references. Address STATIM, care of Messrs. Hodgkinson, 198, Upper Whitecross St., E.C

ASSISTANTS WANTED.

AN experienced ASSISTANT for a first-class country business in Lincolnshire. Address F. W. B., care of Mr. Compigné, 262, Camberwell Rd., London.

IMMEDIATELY.—For a Mixed country trade a JUNIOR or IMPROVER with good references. An opportunity for learning mineral water business. State age, salary, &c. WM. ORME, Atherstone.

ENERGETIC ASSISTANT. Age not under 22 or 23. Apply, with reference to last employer. Send photo (if convenient), height and salary required, to R. N. KIDDLE, Bideford, N. Devon.

AN ASSISTANT, age 21 or 22, at end of August. Dispensing ability necessary, and good references required. Apply, with full usual particulars, to J. C. PARKES, Pharmaceutical Chemist, Hare St., Woolwich.

AN ASSISTANT of good appearance and manners, and accustomed to a good class trade. Must be a reliable Dispenser and good Counterman, and capable of being left in charge during absence of principal. E. A. TURNER, 280, Fulham Rd., S.W.

ACTIVE, obliging and trustworthy SENIOR. Out-door and no Sunday duty. A permanency for a suitable man. SEVER & Co., Chemists, 44, Russel St., Southsea.

AN active gentleman to take charge of brisk Retail, 1½ evening and an afternoon (12 hours), 10s. per week. Permanency. Apply, BEDDARD & Co., 44, Camberwell Rd., S.E.

JUNIOR ASSISTANT, for a good class Retail and Dispensing business. Time for study if required. Apply, stating usual particulars to FREDK. T. SHEPLEY, 169, Brockley Rd., S.E.

JUNIOR ASSISTANT, by a Druggist in Demerara. Must be strictly honest and sober, and a quick and accurate Dispenser. Apply, with full particulars, to C. W., care of Hodgkinsons, Stead & Treacher, 198, Whitecross St., E.C.

FAVERSHAM PROVIDENT DISPENSARY.—On the 1st November, a DISPENSER, whose services will be required from 10 to 11.30 in the morning and from 6 to 7 in the evening, and who will have to board himself. Apply, stating age, references, experience, and salary required, to W. E. RIGDEN, Faversham, Kent.

JUNIOR ASSISTANT or IMPROVER for a good country business (Dispensing and Agricultural). No Sunday duty. Time given for study if required. Apply, with full particulars, to Mr. D. JENKINS, Chemist, Bridgend.

JUNIOR.—In-door, with knowledge of Dispensing for London business. Manufacturing neighbourhood. Must be active and of very good character. Salary to commence £40. No Sunday work. Apply by letter, not enclosing carte or testimonials, to TOWN, care of Messrs. Hearon, Squire & Francis, 5, Coleman St., London, E.C.

IMMEDIATELY.—An ASSISTANT of good appearance and address for a Dispensing and Retail business of the best class. Two and an Apprentice kept. Apply, enclosing carte, if possible, and stating previous experience and salary required, to EDWD. PEARSON, Market St., Nottingham.

JUNIOR ASSISTANT. Apply, stating age, height, salary required, references (enclosing carte, to be returned), to G. WINDEATT, Wellington, Somerset.

A GOOD Junior ASSISTANT. Age from 21 to 23. One only kept. Time allowed for study. Apply to F. W. SANDY, 390, Walworth Rd., S.E.

ASSISTANT for India. A sharp business man and good Dispenser. Must write a good hand and be able to keep books. A Scotchman preferred. Age about 25, and single. Apply by letter, to RIVERS & Co., 46, Gresham St., E.C.

ASSISTANTS WANTED.

OUT-DOOR ASSISTANT. 25 to 30 years of age. No Sunday duties. Apply, personally at 143, Hackney Rd.

A JUNIOR ASSISTANT as Improver for the laboratory; also a JUNIOR who writes a good hand, to keep the books and assist at the Dispensing counter. Apply, stating age, height, and previous experience, to GIBBS & GURNELL, Ryde.

TEMPORARY.—For about 10 days on or about August 21st. Must have passed Minor, and accustomed to first-class business. Thoroughly trustworthy in Dispensing. State age, terms and references, with carte (if convenient), to PHARM. CHEMIST, care of Evans, Sons & Co., Hanover St., Liverpool.

APPRENTICE.—A respectable, well educated youth as APPRENTICE. Country business. Comfortable home. Time for study and recreation. Apply to H. B. PALMER, Chemist, Wingham.

TO Parents and Guardians.—A respectable, well educated youth as an APPRENTICE to a good Mixed country business. Work light. Comfortable home. A Major or Minor Assistant kept. Premium moderate. A turnover Apprentice would not be objected to. Apply to Mr. T. RANDALL, Pharm. Chemist, Wareham, Dorset.

TO Students.—A Pharmaceutical Chemist offers board and lodging with assistance in reading, in return for a few hours' service daily. Address, C. P., 3, Dungannon Ter., North End Rd., Walham Green, S.W.

A JUNIOR ASSISTANT who has experience in Dispensing. Apply personally, if possible, or by letter, enclosing carte (to be returned), with full particulars as to salary, references, &c. M. TAYLOR, English and Foreign Chemist and Dentist, 105, Regent's Park Rd., N.W.

AN ASSISTANT, with Minor qualification. Apply, personally if possible, to W. H. STICKLAND, Cromwell Pl., South Kensington, S.W.

WEST LONDON HOSPITAL, Hammersmith, W.—An ASSISTANT DISPENSER, unmarried. Minor qualification. Aged not more than 28 years. Salary as agreed, with residence, fire, light and attendance. Apply in person and bring testimonials at 11 o'clock a.m., on Monday, 18th instant. R. J. GILBERT, Secretary, &c. 14th August, 1884.

ABOUT Sept. 1st.—A Junior ASSISTANT or IMPROVER of steady, obliging, business habits. One possessing a knowledge of Postal and Telegraph duties preferred, but not absolutely necessary. Please state experience, age, height, and salary required, to JOHN JAMES, West Derby, Liverpool.

ASSISTANT (out-door) for Retail Counter (not Dispensing). Hours, 8 to 8, Saturdays 8 to 10. No Sunday trade. State age, height, salary, and when disengaged. H. HODDER, Broad St., Bristol.

IMMEDIATELY.—An active and obliging JUNIOR Out-door. Good references indispensable. Send carte (if convenient), with all particulars, to A. WRIGHT, 109, High St., Lowestoft.

IMMEDIATELY.—A good ASSISTANT, age about 28, in a light class business. Full particulars of previous engagements, to J. GRIFFITHS RICHARDS, Hastings.

IMMEDIATELY.—An active, obliging ASSISTANT, not under 22, accustomed to a Mixed business, to take charge of small Retail, in a country town. Hours easy and no Sunday duty. Address, stating age, salary, experience, and references, enclosing photo., if convenient to S., 28, Victoria St., Lower Broughton, Manchester.

JUNIOR ASSISTANT, who understands Post Office and Single Needle. Must be a neat Dispenser and have good recommendation. Apply to MANAGER, 50, Queen's Rd., Brighton.

ASSISTANTS WANTED.

AN out-door Assistant, well up in Dispensing, and a good Counterhand. Apply, giving full reference, enclosing carte de visite, and stating salary expected, to Goulding's, Cork.

TRAVELLER.—An experienced Traveller, to represent a firm of Wholesale Druggists and Manufacturing Chemists in Transatlantic Countries. Apply, by letter only, to W., 22, Westbourne St., Hyde Park. All communications will be treated as confidential.

A RESPECTABLE and steady young man as Assistant, for a Mixed business, in the country. He must be a good Dispenser and well recommended. Apply, stating age, salary expected, and other particulars, to G. J. Cottrill, Shepton Mallet.

JUNIOR Assistant, accustomed to good middle-class trade, and well up in Dispensing. Wanted at once. State age, height, salary, &c., and enclose photo, to W. H. Webb, Hereford.

A JUNIOR Assistant, accustomed to a Mixed country business. One who has just completed his apprenticeship preferred. Apply, stating usual particulars, W. H. Jones, Chemist, Mountain Ash, South Wales.

A QUALIFIED Assistant accustomed to first-class Dispensing business. Salary £50. Indoor. Apply, stating age, height and previous engagements. Also enclose carte (to be returned). Kilby Pears, Pharmaceutical Chemist, 16, Western Rd., Brunswick Sq., Brighton.

JUNIOR Assistant for general Retail and shipping business. Out-door. State age, salary required and references, to Treharne & Duck, Chemists, Bute Docks, Cardiff.

BUSINESSES FOR DISPOSAL.

AN old established Homœopathic Pharmacy, in a fashionable Midland town, doing full priced trade. Apply to Calendula, care of Homœopathic Publishing Co., 12, Warwick Lane.

SOUTH Wales.—An exceptional and rare opportunity. A profitable Business, in a thickly populated part of a manufacturing town. Country town and shipping trade might be combined by an energetic man. Price £350. For the convenience of any young man wishing to start £100 cash and remainder by instalments to suit purchaser. Welsh not essential. Druggist, care of Messrs. Barclay & Sons, 95, Farringdon St., E.C.

£300.—Retail, Dispensing, and Prescribing. Country. Returns £450. Increasing. Full prices. Price £300. Rare chance for beginners. Opening for Dentistry and Photography. Neither within 6 miles. Good house, garden, and stable. Rent £21. Stock and fixtures worth price. Country, Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C.

IMMEDIATELY.—An old established Drug Trade, situate in market place of a densely populated manufacturing and mining town in South Staffordshire. Shop capitally fitted. Handsome plate-glass front, &c. Returns £410 per annum. Capable of considerable extension. Rent £40. Price £300. Vendor leaving the trade. Apply, Medicus, care of Wyleys & Co., Coventry.

DORSET.—Old established Retail and Dispensing Business, with some Dentistry. Returns £850, at full prices. Large and convenient house, with stabling, coach and warehouses. Lease for 14 years. Good opening for Mineral Water trade. Address, Alpha, 2, Belmont Villas, Exter.

KENT.—A small Business, in an Agricultural district, situate opposite the Post Office. The surrounding hills commanding extensive views. The business prices are good. No agent. Chemist, Wrotham, Kent.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for transfer:—Midlands. Retail and Dispensing trade, with Soda Water business attached. Returning together £3000. Only £2000; including valuable stock, plant, horses, vans, &c. Stafford. Retail and Dispensing. Returns £700. Full prices. £600, or offer. Photo. Somerset (Coast). Retail and Dispensing. Returns £1000. Rent £30. Good house and garden. £900. Suffolk. Unopposed Retail and Prescribing. One family 40 years. Returns £500. Net profit £250. For £350. Rent £25. Norfolk (Coast). Rare opportunity for energetic young man. Retail and Prescribing. Owner retiring. Returns £700. Capable great increase. £350; or with freehold £1650. £1000 remain. Inland Watering Place (West). Retail and Dispensing. Returns £600. Strictly reliable. £500. £100 remain. London. Close to a park. Handsome corner. Elegantly fitted. Returns £650. For £450. Crystal Palace District. Elegantly fitted corner. Retail and Dispensing. Returns £600. For £500. 10 miles out. N. Retail and Dispensing. Returns under manager £600. Rare chance for increasing. Offer. S.W. Well fitted Retail and Dispensing. Returns £350. Owner taken appointment. £150. Fittings worth £250. Bargain. Please apply, 30, Jewry St., Aldgate, City.

S. W.—Chemist's Business. Post Office attached. Nearly pays rent. First-class opportunity for small a pitalist. Letter only to T. A. S., Ambleside House, 8, Loughboro' Park. S.W.

£200.—Fast increasing Branch Business. 10 miles from London, in good suburb. Post Office nearly pays rent. Good reasons for selling. Convenient house. Full particulars from Manager, 1, Southbridge Ter., Croydon.

CHEMIST'S Retail and Prescribing Business, in an excellent position, near Oxford St., London, on easy terms. Rent free for 6 months. Apply by letter in first instance, to Dr. Langley, 50, Lincoln's Inn Fields, W.C.

IMMEDIATELY.—In a good town in Hants. A genuine light Retail, Dispensing, and Prescribing Business. Modern fittings, and well stocked. Returns between £300 and £400. Increasing. Corner shop and side entrance. Owner taking larger business. Price £300, or fair offer. Agents not replied to. Address, F. W., care of Messrs. Edwards & Son, 157, Queen Victoria St., London, E.C.

AN old established first-class family Retail and Dispensing Business, in one of the best suburbs of Manchester. Shop handsomely and substantially fitted. Returns (under management,) £775. Largely Dispensing and very profitable. Apply, Mr. John Blyton, Cheetham Hill, Manchester.

AN old-established Prescribing, Dispensing, and Retail Practice. Densely populated neighbourhood. Well adapted for either surgeon or chemist. Established over 100 years. 7 years lease. £35 per annum; no taxes. Cash receipts over £400 yearly. Premium £120. Address, care of Mr. Jones, 40, Harman St., Kingsland Rd., London.

WANTED TO PURCHASE.

A SOUND Retail, Dispensing, and Prescribing Business, in London district or good seaside town. Making a net profit of not less than £300. A young promising business would be entertained. Principals only. Address, Pharmacist, care of Messrs. Newberys 1, King Edward St., Newgate St., E.C.

BUSINESS. Genuine Retail and Prescribing. Town or country. Returning not less than £800. Particulars in confidence. Assistantship with ultimate succession not objected to. Address, Argentum, 226, Marylebone Rd., London.

FOR SALE.

A SPLENDID pair Specie Jars, on ebonised and gilt stands, extreme heighth 36 inches; other sizes in stock; 2 pair swan neck Carboys and stands; a quantity of large pear-shape ditto; Shop Rounds, blue and white Ointment Jars and Pots, Jujube Jars, and other fancy jars; 24-3, 4, and 5 grain Pill Machines, equal to new; Wall Case, as Maw's fig. A 88; a 12ft. Wall Case; small Dental Case, with specimens; outside Globe Lamp; Sponge Cases, A 41, A 42; a 12ft. Fixture, as Maw's fig. A 84; 2ft. long, 4ft. long, 6ft. long, 8ft. long, 12ft. long mahogany fronted Drawers, glass knobs, glass labels (bevelled edge), with lockers for bottles under, 4ft. high. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

DISPENSING Screen, 5ft. 6in., with counter under, fitted with drawers and plate glass cases in front, a bargain; Dispensing Screens, 5ft., 6ft., 7ft., glass case at each side, with silvered plate-glass centre, with marble slab in front, with carved wood on top, 3ft. high, the cases at each side have plate-glass doors, with tablets on top, 2ft. high, inside each case fitted with silvered glass and shifting shelves; as fig A 53, 5ft. 6in. long, 7ft. 6in. long; as fig. A 54, 4ft. long; as fig. A 55, 5ft., 6ft., 7ft. 6in. long; Sponge Case, A 43; a Centre Case, 8ft. long, 5ft. wide, mahogany; a number of other size Screens and Cases, very cheap. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

FOR Sale. Plate-glass Counter Cases, as fig. A 2, 3ft. long, 4ft. long, 4ft. 6in. long; as fig. A 3, 3ft. long, 3ft. 6in. long; A 6, 4ft. long, 5ft. long, 6ft. long; as fig. A 7, 3ft. 6in. long, 6ft. long; as fig A 8, 5ft. long, 6ft. long; as fig. A 9; as fig. A 13, 4ft. long, 4ft. 6in. long; A 5, 6ft. 6in. long; A 16, 3ft., 3ft. 6in., 4ft. long; A 17, 4ft. long, 4ft. 6in. long; A 18, 5ft. long, 6ft. long, 7ft. 6in. long, 8ft. long, 9ft. long; Tooth Brush Case, A 9, A 10; Desk and Cases, as fig. A 30, 2ft. 6in. long, and 3ft. long, as fig A 31; Cigar Cases, A 34. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

MAHOGANY top Counters, fitted with drawers, 5ft., 6ft., 7ft., 8ft., 14ft., 18ft., and 20ft. long; 12ft. mahogany fronted Counter; 6ft. mahogany fronted Counter; 13ft. 6in. mahogany and plate-glass fronted Counter; 7ft. do., do.; a 16ft. long, 3ft. wide, Side Counter, fitted with drawers; a large quantity of second hand solid oak Drawers, in splendid condition, very cheap; a quantity of Shelving, Cupboard Doors, &c. E. NATALI, 207, Old Street, near Pitfield St., London, E.C.

£200 REWARD.

THE undersigned, the Proprietors of Liebig's Chemical Food or Wine of Phosphates, having reason to believe there is a spurious article on the market, hereby offer a reward of Two Hundred Pounds to any person or persons who shall give such information as will lead to the discovery and conviction of anyone making or offering for sale, spurious or forged imitations of their proprietary article. No travellers are employed, and Goods are never given in payment of accounts, consequently no Liebig's Chemical Food or Wine of Phosphates can be genuine unless it is obtained in the usual way of business from the wholesale houses. If desired, all communications will be treated as strictly private and confidential. LIEBIG & Co., Proprietors of Liebig's Chemical Food or Wine of Phosphates, 12, York Buildings, Adelphi, London, W.C.

IMPORTANT TO CHEMISTS & DENTISTS.

MR. F. THOMAS, for many years manufacturer to the Profession, executes every kind of Mechanical Dentistry. Punctuality, with best materials and workmanship, may be relied upon. PUPIL wanted. 5, Leigham Ter., Balham, S.W

VIZER'S

CHEMISTS' TRANSFER and ASSISTANTS' REGISTRATION AGENCY,

Victoria Chambers, 55, Chancery Lane, London.

MR. EDWIN B. VIZER, Pharmaceutical Chemist, having been engaged in the business for the last 36 years, is prepared to offer special advantages to his clients.

Gentlemen desiring to dispose of their businesses without undue publicity may depend on special precautions to that end, by request.

Purchasers applying for businesses should specify locality preferred and capital to be invested.

The following businesses among others for sale:—

LONDON,	N.W.—	Returns	£500.	Rent	£55.	Price	£250.
„	S.E.	„	£320.	„	£52.	„	£150.
„	S.W.	„	£600.	„	£80.	„	£470.
„	E.	„	£400.	„	£35.	„	£150.
SURREY.		„	£600.	„	£50.	„	£550.
„		„	£400.	„	£32.	„	£240.
KENT.		„	£1000.	„	£40.	„	£400.
HAMPSHIRE.		„	£300.	„	£65.	„	£250.
S. COAST.		„	£350.	„	£65.	„	£250.
S. WALES.		„	£500.	„	£35.	„	£200.

No charge to purchasers.
No charge to vendors unless a sale is effected.

Seaside Businesses Wanted.

Gentlemen having such for sale should send particulars without delay.

ASSISTANTS' REGISTRATION DEPARTMENT.

Employers and Assistants should send full particulars of requirements, with Registration Fee, 2/6, postal order.

An Assistant writes, unsolicited: "*Thank you very much for referring me to Mr.———. With much pleasure I will recommend your system wherever I have an opportunity.*"

HENRY GADD,

Member of the Pharmaceutical Society,

CHEMISTS' TRANSFER AGENT,

97, FORE STREET, EXETER.

H. G. will be happy to furnish intending purchasers with particulars of Businesses from his Register. He has several to offer in Town and Country, to suit large or small capitalists.

Applications for either the sale or purchase of Businesses inserted in Register free of charge.

TO CHEMISTS FITTING UP, &c.

THE whole of the Fittings for a shop, including Bottles, Jars, &c., part new and part second-hand, price £35. One 6 ft. panelled Counter, with Spanish mahogany top, price 60s. Lot of new 8 gallon Globes, 17s. 6d. each. Lot of 2 gallon second-hand ditto, 4s. each. Apply, R. TOMLINSON, 15, St. Paul's Sq., Birmingham.

72 SECOND-HAND 20 oz. Stoppered Rounds, with new labels, price 48s. 72 ditto, 6 and 8 oz., with most labels in good condition, 35s. Large second-hand patent Specie Jar and cover, on stand, 35s. 24 6 lb. white Ointment Jars, price 25s. A lot of second-hand 2 gallon Globes, 4s. each. Range of 90 second-hand Drawers, with gold labels and glass knobs, lockers under and cupboard on end, make up 12 ft., with shelving and cornice over, price £7. Handsome Dispensing Screen, 5 ft. 3 in. long, £6, cost £15. A large stock of Counters and glass Cases. Full particulars, estimates, and lists free. Workmen sent to all parts of the country. Apply, R. TOMLINSON, 15, St. Paul's Sq., Birmingham.

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Trade Valuer and Auctioneer,

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VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Purchasers have, at this agency, the advantage of about 300 Businesses to select from, requiring from £100 to £3000 capital.

Probate and Fire Insurance valuations.

SOUTH COAST.—Profitable Retail and PRESCRIBING, in good town, returns over £400, good house, price £270.

KENT.—Returns £1000, seaside, to be sold cheap, and part cash remain.

NORTHAMPTONSHIRE.—Good country RETAIL, capable of very considerable extension, good house, garden, &c., returns £650, price £350.

LANC.—Returns £1500, good Specialities have large sale throughout the district, valuation, £800.

BIRMINGHAM (suburb).—Light RETAIL, as Branch returns about £500, price £350.

BIRMINGHAM.—Light RETAIL, improving part, owner having bought another business will sell cheap, returns £400, price £175, or reasonable offer.

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Chemists' Agents and Valuers,

WALBROOK CHAMBERS, 38, WALBROOK,

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HAVE THE FOLLOWING BUSINESSES FOR DISPOSAL:—

1. LONDON, S.E.—Light Retail, Dispensing and PRESCRIBING. Established two years. Returns £600. Price £550.
2. MIDLANDS.—First-class Dispensing, Prescribing and RETAIL. Returns £800. Net profits £300. Good house and large garden. Price £750. Illness cause of sale.
3. LONDON, N.W.—Neglected BUSINESS. Now returning £5 a week, and capable of great extension. Price £160.
4. ESSEX.—Old established and very profitable BUSINESS. Returns £600 to £700. Good house and garden. Price £650.
5. LAKE DISTRICT.—Branch BUSINESS. Under management returns £400; could easily be doubled. Price £250.
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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 739.] SATURDAY, AUGUST 23, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

Page

Quinine and Homoquinine. By O. Hesse 141
Bismuth and Pepsin. By R. Rother .. 144
Erythroxylon Coca. By Dr. Squibb .. 145
The Noyau or Noyeau Vine or Plant: Ipomœa Sinuata, Ortega. By W. Ferguson 147
Dietetic Delusions: their Deleterious Effects, and their Rectification. By R. M. Hodges, M.D. (*concluded*) 148

EDITORIAL ARTICLES AND NOTES:—

The Revision of the Pharmacopœia.. 151
Notes:—Medical Opinion on Foreign Preparations—The Alleged Pharmacy Accident in a French Pharmacy—Poisonous Dose of Pills—Large Sale of Quinine—Cholera Precautions 152

Page

BRITISH PHARMACEUTICAL CONFERENCE:—

Final Report on the Alkaloidal Value of Cultivated and Wild Belladonna Plants. By A. W. Gerrard 153
Report upon the Estimation of the Alkaloids in Atropa Belladonna. By W. R. Dunstan and F. Ransom 154
A few Notes on the Growth of Belladonna and Hyoscyamus. By T. J. Hasselby 154
Report upon an Investigation on the Chemistry, Botany and Pharmacy of the Strychnos Nux-Vomica. By W. R. Dunstan and F. W. Short 156

Page

Notes on the Estimation of Hydrocyanic Acid and Cyanides. By L. Siebold 158

PARLIAMENTARY AND LAW PROCEEDINGS:—

The Sale of Paregoric Elixir Devoid of Opium 159

REVIEW:—

Thompson's 'Dictionary of Domestic Medicine and Household Surgery' 159

OBITUARY 160

CORRESPONDENCE:—

The Popular Use of Henbane Seeds.. 160
Answers to Correspondents 160

Pharmaceutical Society of Great Britain.

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

LIBRARY AND MUSEUM
SPECIAL NOTICE.

The Library and Museum will not be open in the evening during August and September.

The Library and Museum will be closed from September 1st to September 13th, both dates inclusive, for revision.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

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The Catalogue of the Museum may be obtained from the Secretary, price 2s.; or by post, 2s. 4d. Each Member, Associate, and Apprentice of the Society will be supplied with one copy *gratis*, on application to the Secretary.

NORTH BRITISH BRANCH.

The Society's Rooms at 119A, George Street, Edinburgh, will be closed from and after Saturday, August 16th, and the new premises at 36, York Place, Edinburgh, will be opened on Wednesday, October 1st.

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NEPENTHE.

FERRIS & CO. *v.* GOODMAN.

Notice is hereby given, that by an Order of the Chancery Division of the High Court of Justice, made the 18th day of July, 1884, in the above action, it was ordered that the Defendant and others be **perpetually restrained** from selling, or offering for sale, any formula or recipe for **"Nepenthe,"** and from otherwise prejudicing the sale thereof by, or injuring the title thereto, or Trade Mark therein, of the Plaintiffs, Messrs. FERRIS & Co., of Bristol, Wholesale Druggists, the **Registered Proprietors thereof.**

And it was further ordered that the Defendant do pay the costs of the said action.

Dated this 12th day of August, 1884.

(Signed) CHILTON & GREEN-ARMYTAGE, Bristol,
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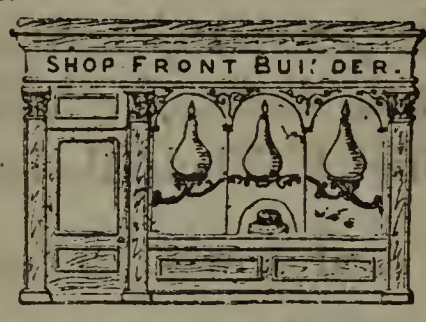

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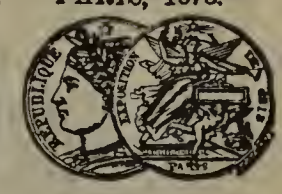

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"New York Medical Journal," *August* 1880,
Dr. F. Weir,
in Lecture delivered to the College of Physicians and Surgeons, New York.

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QUININE AND HOMOQUININE.*

BY O. HESSE.

I. Quinine.

The question, formerly raised repeatedly, whether quinine occurs in other barks than those of the genus *Cinchona*, I was able to answer in the affirmative in 1871, when I showed that a bark at that time coming into commerce and erroneously sent out as a cinchona bark,—the china cuprea, which we now know to be derived from *Remijia pedunculata*,—actually contained this alkaloid.† My priority in this discovery has indeed been contested, in that J. E. Howard has stated‡ that already in 1857 he had observed this bark in the London market and found it to contain quinine, although he had published nothing respecting it. But since Howard only a short time previously (November, 1869) had afresh affirmed to the quinologist Weddell§ the experimental law at that time generally held to to be correct, that the cinchona alkaloids were peculiar to the cinchonas only, it may be assumed that Howard first had his attention drawn to the presence of quinine in the bark in question by my discovery, which Flückiger had communicated to him privately.

Far more important than this point is the question whether the alkaloid of cuprea bark then spoken of as quinine was quinine, or only an alkaloid similar to it, homoquinine. Notwithstanding that at the time I found the alkaloid in question to correspond in every respect with quinine obtained from true cinchona bark, I have once more examined the original cuprea bark in connection with my experiments upon homoquinine, the former results being confirmed most completely. Subsequently, also, it was pointed out by me that in cuprea bark quinine is not accompanied by cinchonidine, which has equally been since confirmed by D. Howard and others. On the other hand, according to my observation, quinine is always present in cuprea bark, although the quantity is sometimes relatively very small.

The constant occurrence of quinine in cuprea bark and the persistent absence from it of cinchonidine is so far of special interest that it has been assumed in several quarters, especially by J. E. Howard,‖ that the plants in their development and growth are capable of converting quinine and cinchonidine into one another. Of course in order to make this conversion perceptible certain influences on the development of the plants or their cultivation at different altitudes are required. Nevertheless, the assumption of such a change as this during the development and growth of the plant proves faulty, since if such a conversion actually took place under the conditions named, it would certainly be possible to discover a sample of cuprea bark in which at least traces of cinchonidine would be present.

Although I am in the position to detect the smallest traces of cinchonidine with quinine, all the experiments made in this direction with cuprea bark, as well as with quinine obtained from that bark, have remained without success, a result that justifies me in saying that the formation of the quinine within the plant takes place quite independently of the cinchonidine.

On account of the absence of cinchonidine it is very easy to prepare pure quinine sulphate from cuprea bark. This has normally, whilst yet uneffloresced, the composition represented by the formula $(C_{20}H_{24}N_2O_2)_2,SO_4H_2+8\,H_2O$, like the similarly pure salt obtainable from cinchona barks.* The possibility is not, however, excluded that the commercial sulphate obtained from cuprea bark may contain somewhat less than eight molecules of water of crystallization, not only because it has effloresced more or less, but also because it contains an admixture of homoquinine.

II. Homoquinine.

The occurrence in cuprea bark of a special alkaloid, similar in many respects to quinine, was announced simultaneously, in December, 1881, by D. Howard and Hodgkin,† Paul and Cownley,‡ and G. Whiffen,§ the alkaloid being named by the first two chemists "homoquinine," and by Whiffen "ultraquinine." The name "cupreine" has also been suggested for it. This same alkaloid was also observed by one of my colleagues a year earlier; but he considered it to be cinchonidine until June, 1881, when he became aware of the error.

According to Tod the alkaloid in question first appeared in cuprea bark in September, 1880, but only in a few specimens of bark; its occurrence first became almost general in May, 1881. The amount of homoquinine in the bark in many cases reached 0·3 per cent., in some 0·5 to 0·6 per cent. According to Whiffen the cuprea bark examined shortly before the publication referred to contained 0·1 to 0·8 per cent. of the alkaloid, and he believed that in greater or less quantity it was to be met with in every cuprea bark. Paul and Cownley first observed it very frequently four months before their communication (consequently first in August, 1881). D. Howard, who appears not to have observed it so frequently as Paul and Cownley, states that the quantity of homoquinine in the barks in question amounted to about 10 per cent. of their quinine

* From the *Annalen der Chemie*, ccxxv., 95.
† *Berichte*, iv., 818.
‡ *Neues Jahrbuch f. Pharm.*, xxxvi., 296; Flückiger, 'Die Chinarinden,' 1883, 43.
§ *Uebersicht d. Cinchonen*, Weddell, 7.
‖ *Pharm. Journal*, [3], xiii., 1013.

* With respect to the remark of Flückiger upon this salt ('Die Chinarinden,' 1883, p. 55), that "it is not established whether this salt contains seven or eight molecules of water of crystallization, or possibly a quantity lying between the two," I may say that more than twenty years since (*Annalen*, cxix., 361) it was shown by Jobst and myself that the formula $(C_{20}H_{24}N_2O_2)_2,SO_4H_2+7\,H_2O$, for quinine sulphate, is incorrect. On the other hand, it is not so easy to say whether the sulphate in question contains seven and a half or eight molecules of H_2O. A series of experiments, however, carried out by me with every precaution, showed that pure uneffloresced sulphate may actually contain eight molecules of water of crystallization. In that case the formula attributed to quinine sulphate by Robiquet about fifty years ago would be correct.

Undoubtedly the commercial sulphate may contain generally less water than is required by the formula $(C_{20}H_{24}N_2O_2)_2,SO_4H_2+8\,H_2O$,, and for this reason, that in manufacturing operations it is almost impossible to prepare it dry and avoid at the same time the occurrence of a partial efflorescence of the salt. Quite apart from the fact that in certain quarters a smaller amount of water (for instance, 14·4 per cent.) in quinine sulphate is required, it should not be overlooked that a commercial sulphate corresponding to the legally prescribed tests of the German Pharmacopœia may sometimes contain quite a considerable quantity of cinchonidine sulphate (*Annalen*, ccv., 222), upon which a deficiency in water of crystallization may equally depend.

† *Pharm. Journ.*, [3], xii., 528.
‡ *Pharm. Journ.*, [3], xii., 497.
§ *Pharm. Journ.*, [3], xii., 565.

contents, consequently to about 0·2 per cent. Finally to complete the history of our alkaloid it may be mentioned that Wood and Barret* were unable to observe this alkaloid in several hundred specimens of cuprea bark which they examined specially for the purpose, and they believed that it might be a compound of quinine with conchinine.

With respect to this latter point, my examination of the alkaloid prepared by Tod, as well as of some kindly supplied to me by Paul and Cownley, has shown that this material is free from conchinine. Moreover the statement made by Whiffen, as well as those of Howard and Hodgkin, point to the same conclusion, so that the opinion of Wood and Barret referred to would appear to be without support, quite apart from the fact that I have been unable to obtain any such compound of quinine and conchinine in working according to the directions originally given by those chemists.

All the above-named chemists who have indicated the existence of homoquinine in one way or another are unanimous that the alkaloid in question forms with sulphuric acid a neutral salt rather difficultly soluble in cold water; it is presumed consequently that it would be necessarily mixed with quinine sulphate prepared from the particular bark, since it would not be separated or altered in any way during the manufacture of quinine.

According to my experience the best method of separating homoquinine from such a mixture is by dissolving it in dilute sulphuric acid, precipitating the alkaloids with ammonia and at once shaking them out with ether, from which after a short time the homoquinine separates out in crystals. The crystallized homoquinine, after being separated as completely as possible from the mother-liquor, is redissolved in dilute sulphuric acid, and again precipitated with ammonia and taken up with ether, which quickly deposits the alkaloid in crystals. This operation is repeated as often as may be necessary, but generally a second recrystallization of the base in this way suffices to separate any admixture of quinine.

On a previous occasion,† I had, upon the basis of the results of analyses I. and II., which were before me at the time, represented homoquinine by the formula $C_{19}H_{22}N_2O_2$. But in the course of this investigation it has given weighty evidence in favour of the formula $C_{20}H_{24}N_2O_2$, with which, moreover, analysis IV., made by me only recently with well crystallized material, corresponds very well. Before analysis the substance was dried at 120° to 125° C.; it then gave:—

I. 0·2154 gram 0·5820 CO_2 and 0·1420 H_2O
II. 0·2436 gram 0·6535 CO_2 and 0·1555 H_2O
III. 0·2453 gram 0·6660 CO_2 and 0·1585 H_2O
IV. 0·2613 gram 0·7095 CO_2 and 0·1765 H_2O

	Calculated for		Found.			
	$C_{19}H_{22}N_2O_2$	$C_{20}H_{24}N_2O_2$	I.	II.	III.	IV.
C.	73·54	74·07	73·73	73·16	74·04	74·05
H.	7·09	7·41	7·35	7·09	7·17	7·50

From ether containing water homoquinine separates, if undisturbed, partly in concentrically grouped needles, partly in stout decided prisms, derived from the rhombic system, terminating at the ends in a dome, the crystals being sometimes isolated and sometimes a few concentrically aggregated together. In a disturbed crystallization, on the other hand, according to the degree of concentration of the solution, either a sandy powder or a crystallization consisting of delicate lamellæ is obtained. In all cases it contains water of crystallization, the quantity varying between 2 and $2\frac{1}{2}$ molecules, a part of which is readily given off at 80° to 100° C., and the remainder first at 120° to 125° C.

I. 0·2438 gram gave at 120° to 125° C. 0·0284 H_2O
II. 0·2784 gram gave at 120° to 125° C. 0·0303 H_2O
III. 0·2500 gram gave at 120° to 125° C. 0·0260 H_2O
IV. 0·2733 gram gave at 120° to 125° C. 0·0273 H_2O
V. 0·2935 gram gave at 120° to 125° C. 0·0322 H_2O
VI. 0·6085 gram gave at 120° to 125° C. 0·0710 H_2O

	Calculated for	
	$C_{20}H_{24}N_2O_2+2H_2O$	$C_{20}H_{24}N_2O_2+2\frac{1}{2}H_2O$
H_2O	10·0	12·19

Found					
I.	II.	III.	IV.	V.	VI.
11·65	10·88	10·40	10·00	10·97	11·66

Crystals of homoquinine exposed to the air gradually become dull through efflorescence; in the more compact crystals, however, the amount of water never falls below 10 per cent.* They can be exposed directly to a temperature of 100° C. without any fear that they will fuse, like, for instance, crystallized quinine trihydrate. At that temperature the alkaloid loses only a portion of its water of crystallization; it first melts at 170° C., forming, upon cooling, a colourless, amorphous mass.

Homoquinine dissolves in ether with somewhat more difficulty than quinine; its solution does not gelatinize upon evaporation of the ether, but crystallizes up to the last drops, if the ether be absolutely free from alcohol. In chloroform it dissolves readily, but with more difficulty in benzol and very slightly in light petroleum spirit. Alcohol dissolves it freely and leaves it upon evaporation in the amorphous form.

The alcoholic solution of homoquinine tastes intensely bitter and has a strongly basic reaction; it neutralizes hydrochloric and sulphuric acids perfectly. Its solution in an excess of dilute sulphuric acid shows a blue fluorescence, which is dispelled by sodium chloride and other haloid salts. Hydrochloric acid also removes this appearance, and a solution of the base in hydrochloric acid shows no fluorescence. These solutions rotate the plane of polarized light to the left; they give upon the addition of chlorine water or hypochlorite of lime and excess of ammonia a dark green colour, like quinine.

With acids homoquinine forms neutral and acid salts, which, so far as they have up to the present been examined, correspond in their behaviour towards precipitants, such as sodium hydrate and carbonate and ammonia, with the corresponding quinine salts; on the other hand, they differ from them in their form and partially in their greater solubility. On account of insufficiency of material I have only been able to deal at all exhaustively with the following salts:—

Neutral Hydrochlorate of Homoquinine is obtained

* *Chemical News*, xlv., 6.
† *Berichte*, xv., 857.

* The substance obtained in delicate lamellæ effloresces very rapidly, and frequently after a few hours the quantity of water of crystallization amounts to only about 6 per cent. This phenomenon may probably be partially due to the larger surface which the lamellæ have as compared with the more compact crystals.

by neutralization of an alcoholic solution of the alkaloid with hydrochloric acid. Upon evaporation of this solution an amorphous residue is left that dissolves readily in water. The aqueous solution leaves again upon spontaneous evaporation an amorphous residue.

Acid Hydrochlorate of Homoquinine is obtained upon adding some hydrochloric acid to a concentrated aqueous solution of the neutral hydrochlorate; the acid hydrochlorate separates at once in stout colourless prisms, which dissolve pretty freely in water, but less readily in hydrochloric acid.

Acid Chloroplatinate of Homoquinine.—Upon mixing an aqueous solution of the previous salt with platinum solution a pale yellow flocculent precipitate results, which almost immediately is re-arranged in small orange-red prisms. The salt contains water of crystallization that is first given off at 120° C.

Hydrosulphocyanide of Homoquinine is obtained upon mixing a solution of the neutral hydrochlorate with potassium cyanide. It is amorphous, dissolves slightly in cold water, but more freely in hot water and in alcohol.

Neutral Sulphate of Homoquinine is obtained upon saturation of hot dilute sulphuric acid with the base. Upon cooling of the solution the sulphate crystallizes in short six-sided colourless prisms, which being very brittle are broken more or less in collection. The salt dissolves in about thirty parts of boiling water, very slightly in cold water, freely in boiling alcohol, and is nearly insoluble in chloroform and ether.

Samples prepared on different occasions gave upon analysis the following results:—

I. 0·2490 gram gave at 120° C. 0·0333 H_2O.
II. 0·4848 gram gave at 120° C. 0·0608 H_2O.
III. 0·3300 gram gave at 120° C. 0·0420 H_2O and 0·0925 SO_4Ba.
IV. 0·2243 gram gave at 120° C. 0·0293 H_2O.

	Calculated for $(C_{20}H_{24}N_2O_2)_2,SO_4H_2+6H_2O$.	Found. I.	II.	III.	IV.
H_2O	12·64	13·37	12·50	12·85	13·01
SO_3	9·37	—	—	9·62	—

The crystals of this salt effloresce superficially in air, and become consequently dull; the loss of water is, however, not worth notice. Even after a considerable time the water of crystallization amounts still to 12·50 per cent. On the other hand, quinine sulphate exposed to exactly the same conditions would at the end of a couple of hours have fallen to a powder, and would then contain only 4·2 to 4·6 per cent. of water. If the two sulphates, dehydrated at 120° C., be exposed to moist air, the quinine sulphate rapidly takes up 4 per cent. of water, but the homoquinine almost three times as much, namely, 11 to 12 per cent.

It was of especial interest to ascertain the behaviour of homoquinine to polarized light, since the alkaloid on account of this behaviour received from Whiffen the name "ultraquinine." According to Whiffen this sulphate in acid solution showed $(a)_D=-221°$, whilst quinine sulphate only showed $(a)_D=-196°$. Of the water of crystallization of the two sulphates, in which they certainly differ from each other, Whiffen makes no mention, so that it is quite possible that the difference in question was purely dependent upon the different quantities of water of crystallization which they contain.

In my experiments the amount of water of crystallization was first exactly estimated, and then a quantity of each of the hydrated sulphates corresponding to 1·25 gram of anhydrous salt was dissolved in 10 c.c. of normal hydrochloric acid. These solutions were then each diluted with water up to 25 c.c., and finally examined at $t=50°$ and $l=220$, the deviation being sometimes determined first by means of the quinine solution, and then this solution changed for the homoquinine solution, and sometimes the order being reversed. In this way it was ascertained that *the two solutions did not differ from one another in respect to their optical behaviour.* In an average of thirty determinations $a=25·92°$, which gives for the anhydrous sulphate $(a)_D=-235·6°$.

Neutral Tartrate of Homoquinine is obtained by mixing a hot aqueous solution of the sulphate with solution of rochelle salt. It forms delicate white concentrically grouped needles, which dissolve with some difficulty in hot water and are very slightly soluble in cold. The composition of the salt is represented by the formula—

$$(C_{20}H_{24}N_2O_2)_2,\ C_4H_6O_6+2H_2O.$$

0·3305 gram of air-dried substance gave at 120° C. 0·014 H_2O.

	Calculated.	Found.
H_2O	4·31	4·23

The tartrate dried at 120° C. takes up from moist air only 1 molecule of H_2O; it has then the same percentage composition as neutral tartrate of quinine.

This dissimilar composition of the two tartrates must not be overlooked in the estimation of quinine optically by the method of Oudemans, jun.,* otherwise, up to about 4 per cent. of cinchonidine sulphate might be "found" in a quinine sulphate obtained from cuprea bark in which not a trace was present. This mistake may, however, be easily avoided, by previously determining the amount of water in the tartrate, and as I have done in my optical quinine test,† starting from the anhydrous salt.

III. Conversion of Homoquinine into Quinine.

Some observations which I made during the investigation of cuprea bark agreed pretty well with the presumption that under certain conditions homoquinine might change into quinine. To ascertain these conditions I first heated the alkaloid to 100° C. with dilute hydrochloric or sulphuric acid, sometimes in open vessels and sometimes in closed tubes, but without result. Hydrochloric acid of specific gravity 1·125 acted no better; but upon heating the latter solution some hours to 140° C., methyl chloride and apoquinine were formed, as with quinine. Nevertheless, I was unable to separate quinine from this solution by means of ammonia before this formation took place. If, however, soda ley were used for the precipitation of the alkaloid, a certain quantity of quinine now resulted. In consequence of this observation I was now able, by repeated precipitations with soda ley, shaking the precipitates with ether, and this solution with very dilute sulphuric acid, to convert homoquinine completely into quinine. The conversion is essentially accelerated by heating the base with soda ley, a previous heating of the acid solution being thereby made unnecessary.

From the quinine obtained through conversion of homoquinine the neutral sulphate was prepared, which gave—

I. 0·5425 gram at 120° 0·0893 H_2O.
II. 0·7320 gram at 103° 0·1170 H_2O.
III. 0·4625 gram at 120° 0·0720 H_2O.

* *Annalen*, clxxxii., 65.
† *Annalen*, ccv., 217.

Calculated for	Found		
$(C_{20}H_{24}N_2O_2)_2,SO_4H_2+8H_2O$	I.	II.	III.
H_2O . . . 16·17	16·46	15·97	15·54

This salt effloresced rapidly in dry air and then contained still 2 molecules of H_2O. On the other hand, the dried sulphate quickly took up 4 to 4·6 per cent. of water.

In other respects also, no difference could be recognized from the known pure sulphate.

IV.—Concluding Remarks.

The foregoing results justify the conclusion that Barret and Wood in their investigation converted the homoquinine into quinine and that it thus escaped observation by them. I myself also had previously fruitlessly endeavoured to prepare the alkaloid in question from cuprea bark. It was only after a series of English chemists had simultaneously affirmed the existence of homoquinine that I felt I ought to drop my doubts as to the peculiarity of the alkaloid, which was at any rate first prepared by Tod; but up to that time I had considered the substance in question to be none other than *crystallized quinine.*

Upon the grounds stated my original opinion as to the nature of this substance might still be correct. It is true that at present I have not yet succeeded in preparing homoquinine from cinchona bark, and it may be there is no present prospect that it is obtainable from that bark, so that this substance may still pass as characteristic of the *Remijia pedunculata*, which yields the cuprea bark. But I might maintain to the contrary that I formerly had the opportunity of being able to point out that quinine under certain conditions would become modified, in that it passed into the anhydride, and that this substance also *behaved as a special alkaloid.* At that time also I succeeded in reconverting this substance into ordinary quinine through prolonged treatment with dilute sulphuric acid, though not through precipitation with soda lye.*

Besides this modification of quinine there exists at least one more, which forms with sulphuric acid a neutral sulphate that separates from a hot aqueous solution as a jelly, only subsequently assuming the crystalline form.† I was formerly inclined to place this peculiarity of the sulphate in question to the account of a colouring substance, concerning which not much was known. Nevertheless, exactly those solutions from which quinine sulphate separates at first in a gelatinous form are so little coloured that the cause of the gelatinization might far rather be sought in the absence of colouring matter. I may also add that in the cases mentioned, if the alkaloid be taken up in ether, the ethereal solution gelatinizes relatively easily. These peculiarities of the alkaloid disappear, however, most surely if the sulphuric acid solution be subjected to a prolonged boiling.

The most important results of the foregoing investigations may be brought together in the following propositions:—

(1.) Homoquinine is a modification of quinine.

(2.) Cuprea bark in many cases contains this modification together with quinine.

(3.) Several modifications of quinine exist, which by suitable treatment pass into ordinary quinine.

* *Annalen*, clxxvi., 207.

† *Annalen*, clxvi., 262.

BISMUTH AND PEPSIN.*

BY R. ROTHER.

The writer found that by heating 1 m. of bismuth citrate with 2 ms. of ammonium bicarbonate in the presence of about ten times their weight of water, a perfect solution rapidly results, attended by copious effervescence of carbonic anhydrate. By augmenting the citrate further combination takes place and thus generates a crystalline compound. A further increase of the citrate is also absorbed, whilst the compound becomes more and more insoluble. When the citrate is so far augmented as to stand in the proportion of 1 m. to 1 m. of the bicarbonate the whole of it does not combine. By treating 1 m. of bismuth citrate in a similar manner with 2 ms. of sodium bicarbonate a perfect solution is obtained which on evaporation yields a slightly deliquescent colourless scaled salt. The same results when 1 m. of sodium monocarbonate is used. An excess of either carbonate on the application of heat precipitates a bulky and gelatinous bismuthyl carbonate. Excess of citrate is absorbed as in the case of the ammonium salt. A small excess yields a clear solution which on condensation gives a white granular and soluble residue. An increased amount of citrate up to 1 m. for 1 m. of the bicarbonate enters into combination, but the resulting compound is only soluble in a very large volume of water aided by heat.

One m. of bismuth citrate treated with 2 ms. of potassium bicarbonate or 1 m. of the monocarbonate in the preceding manner also gives a clear solution, decomposable by excess of carbonates, and yields on evaporation a very deliquescent colourless scaled salt. A slight excess of citrate readily dissolves and then produces, as in case of the sodium compound, a granular very soluble residue. An increase of the citrate up to 1 m. for 1 m. of the bicarbonate readily combines forming a rather freely soluble compound having a decided acid reaction and being possessed of absolute permanence in any volume of water. It is not decomposed by neutral chlorides, but chlorhydric acid destroys it with precipitation.

The salt generated by 2 ms. of potassium bicarbonate and 1 m. of bismuth citrate, and to which sodium and ammonium form corresponding analogues, is constitutionally represented by the formula:—

$$\begin{matrix} Bi=(OH)_2 \\ | \\ Ci=K_2 \end{matrix}$$

Then the salt formed by 1 m. of the bicarbonate may be indicated by the formula:—

$$\begin{matrix} Bi-(OH) \\ \| \\ Ci-K \end{matrix}$$

There are, however, plausible reasons that the structural symbol is—

$$\begin{matrix} Bi=O \\ | \\ H-Ci-K. \end{matrix}$$

A mixture of this acid salt with the preceding neutral one results when an excess of bismuth citrate reacts upon the alkaline carbonates as already explained above. This mixture is absolutely permanent in aqueous solution, but the chief interest attaching to it rests in the fact that it forms no insoluble combinations with pepsin. The perfect stability of the solution renders it the achieved desideratum upon which the following process for a perfect and permanent acidulous solution of bismuth and pepsin is based:—

Pepsin saccharated	250 parts.
Bismuth citrate	100 parts.
Potassium bicarbonate sufficient.	
Diluted chlorhydric acid . . .	20 parts.
Alcohol	1000 parts.
Water sufficient to make . . .	10,000 parts.

Mix the diluted chlorhydric acid with 3000 parts of

* From the *American Journal of Pharmacy*, July, 1884.

water, add the pepsin, and macerate the mixture for several days, or until the pepsin is dissolved; then add a crystal of potassium bicarbonate, and when effervescence has ceased decant the solution. Mix the bismuth citrate and 40 parts of potassium bicarbonate with 4000 parts of water, and heat the mixture until effervescence has ceased, and filter the solution. Mix the alcohol with 1000 parts of water and add it to the pepsin and bismuth solutions previously mixed together, with enough water to make the solution weigh 10,000 parts.

ERYTHROXYLON COCA.*

BY DR. SQUIBB.

The condition of the principal markets of the world for this drug for the past six months has been exceptionally bad. That is, whether good coca was sought for in the ports of Central and South Ameriea, or in London, Hamburg or New York, the search, even without limitation in price, was almost invariably unsuccessful. Not that the drug, independent of quality, was scarce, for hundreds of bales were accessible at all times, but the quality was so poor as to be quite unfit for use. The samples, instead of being green and fragrant, were brown and odourless, or musty and disagreeable, at once condemning the lots they represented, to the most casual observation, and yet the price was high enough to have represented a good article. The best that could be done, by the most careful buyers, was to accept occasional parcels, the best of which were of very inferior quality, and therefore unfit for medicinal uses, and these at very high prices. Coca is well known to be a very sensitive and perishable drug, only fit for its somewhat equivocal uses when fresh and green, and well cared for in packing and transportation. Very much like tea in this and other respects, it should be packed and transported with the same care and pains, in leaded chests, or in some equivalent package. It is very well known that tea if managed, transported, handled and sold as coca is, would be nearly or quite worthless, and therefore coca managed as the great mass of it is, must be nearly all of it comparatively worthless. If used as tea is, this would probably soon appear, but when used as a medicine which has been highly extolled and well advertised, it seems to go on equally well whether of good or bad quality. It is pretty safe to say that nineteen-twentieths of the coca seen in the United States market within the past two years must be almost inert and valueless, yet all is sold and used, and its reputation as a therapeutic agent is pretty well kept up. At least many thousands of pounds of the brown ill-smelling leaf, and of preparations made from it are annually sold. And worse than this, considerable quantities of a handsome looking green leaf, well put up and well taken care of, have been sold and used as coca, when wanting in nearly all its characteristics.

The writer for more than a year past has seen but one or two small lots of moderately good coca, and in common with other buyers has been obliged to buy the best that could be found to keep up his supply of the fluid extract. Almost every purchase has been made on mental protest, and he has been ashamed of every pound of fluid extract sent out, from the knowledge that it was of poor quality; and there seems to be no more prospect of a supply of better quality than there was this time last year, because so long as an inferior quality sells in such enormous quantities at good prices the demands of trade are satisfied.

Under this condition of the markets the writer has finally decided to give up making a fluid extract of coca, and has left it off his list, adopting a fluid extract of tea instead, as a superior substitute, for those who may choose to use it, and regrets that this course was not taken a year ago.

The character of coca as a therapeutic agent is not very good. The florid stories of a multitude of travellers and writers, up to and including the testimony of Dr. Mantegazza, received a considerable support from so good an authority as Sir Robert Christison, who reported very definite results from trials made upon himself, and upon several students under his immediate control and observation; and his results seem to have led to a very careful and exhaustive series of observations at University College, London, by Mr. Dowdeswell. This paper, published in *The Lancet* of April 29 and May 6, 1876, pp. 631 and 664, is entitled "The Coca Leaf, Observations on the Properties and Action of the Leaf of the Coca Plant (Erythroxylon Coca), made in the Physiological Laboratory of University College, by G. F. Dowdeswell, B.A." The results of these investigations were absolutely negative, and at the close of the work the investigator says: "Without asserting that it is positively inert, it is concluded from these experiments that its action is so slight as to preclude the idea of its having any value either therapeutically or popularly; and it is the belief of the writer, from observation upon the effect on the pulse, etc., of tea, milk and water, and even plain water, hot, tepid and cold, that such things may, at slightly different temperatures, produce a more decided effect than even large doses of coca, if taken at about the temperature of the body."

Conflicting and contradictory testimony from competent authority is not uncommon in therapeutics, and the reasons for it are well recognized in the impossibility of an equality in the conditions and circumstances of the investigations, and hence the general decision commonly reached is upon the principle of averages.

There can hardly be a reasonable doubt that coca, in common with tea and coffee and other similar articles, has a refreshing, recuperative, and sustaining effect upon human beings, and when well cultivated, well cured, and well preserved, so as to reach its users of good quality and in good condition, it is at least equal to good tea, and available for important therapeutic uses. Mr. Dowdeswell supposed that he used good coca, but it is very easy to see that with any amount of care and pains he may have been mistaken in this. Had he but used the same parcel of coca that Sir Robert Christison did, the results of the two observers would be absolutely incomprehensible; and the results, in the absence of any testimony on that point, simply prove that the two observers were using a different article, though under the same name, and possibly with the same care in selection. On Sir Robert Christison's side of the question there are many competent observers whose testimony is spread over many years; while on Mr. Dowdeswell's side there are fewer observers. But there has been no observer on either side whose researches have been anything like so thorough, so extended or so accurate as those of Mr. Dowdeswell. Indeed, no other account has been met with wherein the modern methods of precision have been applied to the question at all; the other testimony being all rather loose and indefinite, often at second or third hands, or from the narratives of more or less enthusiastic travellers. But if Mr. Dowdeswell's results be accepted as being conclusive, the annual consumption of 40,000,000 of pounds of coca at a cost of 10,000,000 dollars, promotes this substance to take rank among the large economic blunders of the age.*

The testimony in regard to the effects of tea, coffee, Paraguay tea, Guarana and Kola nuts is all of a similar character to that upon coca. Each of these substances seems to have come into use independently, in widely separated countries, to produce the same effects, namely, to refresh, renew or sustain the physical and mental organism, and it was a curious surprise to find, after they had all been thus long used, that although each came

* From *Ephemeris*, July, 1884.

* An excellent summing up of the character and history of coca, from which some of the writer's information has been obtained, will be found in 'Medicinal Plants,' by Bentley and Trimen, vol. i., article 40.

from a different natural order of plants, the same active principle, namely, caffeine, could be extracted in different proportions from all. It is now still more curious, however, to find that for centuries another plant, namely, coca, yielding a different principle, has been in use for similar purposes, the effects of which differ as little from those of tea, coffee, etc., as these do among themselves. Yet cocaine is chemically very different from caffeine, simply producing a similar physiological effect in much smaller doses. All these substances in their natural condition seem to be identical in their general physiological effect, but idiosyncrasy, or different individual impressibility or sensitiveness, causes a different action, as well in quality as in degree from the different substances, upon some persons.

In order to try to throw a little additional light on the comparative activity of the principal individuals of this group of substances, the following trials were made. It is generally admitted, and is probably true, that the same power in these agents which refreshes, recuperates and sustains in the condition which needs or requires such effects, also counteracts the tendency to sleep or produces wakefulness when a tendency to sleep exists, and, therefore, if a tendency or disposition to sleep could be prevented by these agents, this tendency might be used as a measure of their effects when used in varying quantities, and thus measure the agents against each other for dose, or quantitative effect. In this way the proposition is to first measure coca against tea, then coffee against guarana, and finally to compare the four agents, using pure caffeine as a kind of standard to measure by.

An opportunity for such trials occurred in a healthy individual sixty-five years old, not habituated to the use of either tea, coffee, tobacco or any other narcotic substances, of good physical condition and regular habits, and not very susceptible or sensitive to the action of nervines or so-called anti-spasmodics. Quantities of preparations of valerian, asafœtida, compound spirit of ether, etc., which would yield a prompt effect upon many individuals seem to have little or no effect upon him, nor do moderate quantities of wines or spirits stimulate him. That is to say, he has not a very impressible nervous organization, is not imaginative, nor very liable to accept results on insufficient or partial evidence.

Fully occupied with work, both physical and mental in due proportion, for more than ten hours every secular day, when evening comes he finds himself unable to read long on account of a drowsiness supposed to be of a purely physiological character. With a full breakfast at about 7.30, a full dinner at about 2.30, and a light evening meal about 7; and no stimulants or tea or coffee at any time, he finds, as a matter of not invariable but general habit, that by half-past 8 drowsiness becomes so dominant that it becomes almost impossible, and generally impracticable, to avoid falling asleep in his chair while attempting to read, even though ordinary conversation be carried on around him.

The first trial to combat or prevent this drowsiness was made with caffeine. The first specimen used was a very beautiful article made by Merck, of Darmstadt, and after that by pure specimens made for the purpose, the two kinds being found identical in effect.

Commencing with a one grain dose at about 6.30 p.m., on alternate evenings, leaving the intermediate evenings in order to be sure that the nightly tendency still persisted—and increasing by half a grain each alternate evening, no very definite effect was perceived until the dose reached 2½ grains, and this dose simply rendered the tendency to sleep resistible by effort. After an interval of three evenings with the tendency to sleep recurring with somewhat varying force each evening, a dose of 3 grains was taken—the maximum single dose of the German Pharmacopœia. This gave a comfortable evening of restedness, without sleep, or any very strong tendency to it until ten o'clock. Without anything to counteract sleep, the rule was to read with difficulty by nine, without much comprehension by a quarter-past nine, and either be asleep, or go to bed by half-past nine. The 3 grain dose of caffeine repeatedly obviated all this discomfort up to ten o'clock, but did not prevent the habitual, prompt and sound sleep, from the time of going to bed till morning.

This was the model established, upon and by which to measure all the other agents, and they were never taken nearer than on alternate evenings, with occasional longer intervals, especially when the final doses of record were to be taken.

The next agent tried in precisely this same way was coca, and knowing that the quality of that which was attainable was very low, the commencing dose of the leaf in substance was 2 drachms, or about 8 grams. This gave no very definite effect, but 2½ drachms did give a definite effect, and a subsequent dose of 2½ fluid drachms of a well made fluid extract of coca gave about the same effect as 2½ grains of caffeine. Three fluid drachms of the fluid extract were about equivalent to 3 grains of caffeine.

Both the coca used and the fluid extract were then assayed by the modern methods, for the proportion of the alkaloid they contained.

The only assays of coca that could be found conveniently were those of Dr. Albert Niemann, of Goslar, given in the *American Journal of Pharmacy*, vol. xxxiii., p. 122, who obtained ·25 per cent.; and of Prof. Jno. M. Maisch, in the same volumne of the same journal, p. 496, who obtained 4 grains of alkaloid from 1500 grains of coca, which is also about a quarter of one per cent. These assays were, however, very old, and made by the old process. The process used by the writer was the more modern one of Dragendorff slightly modified. It was as follows :—

Thirty grams of powdered coca, thoroughly mixed in a mortar with 8 grams of caustic magnesia, was stirred into 200 c.c. of boiling water, and the mixture boiled for ten minutes. The liquid was filtered off, and the residue percolated with about 60 c.c. of water. It was then again stirred into 150 c.c. of boiling water, and was again boiled and percolated until apparently thoroughly exhausted. The total liquid, amounting to more than 600 c.c., was evaporated on a water-bath, commencing with the weaker portions, so that the stronger ones might be exposed to the heat for the shortest time—until reduced to about 20 c.c. This liquid extract was transferred to a flask and vigorously shaken with 50 c.c. of strong ether. The ether was poured off, as closely as practicable, into a tared capsule, where it was allowed to evaporate spontaneously. A second and third portion of ether, each of 50 c.c., were used in the same way, and then the whole evaporated to dryness in the capsule. A scanty, greenish, oily residue was left in the capsule, in which there was no appearance of a crystallized alkaloid. The capsule and contents were then weighed and the weight noted. The oily residue was then repeatedly washed with small quantities of water, until the washings no longer affected litmus paper. The oily matter adhered to the capsule during this process, no part of it coming off with the washing, and at the end of the washing the capsule and contents were again dried and weighed, and the weight subtracted from the original weight. The difference was taken as the alkaloid cocaine, and it amounted to ·077 gram, equal to ·26 per cent.

Several preliminary assays were made in reaching this method. Some authorities recommend the very finely powdered mixture of coca and magnesia, or coca and lime to be at once exhausted with ether. Others recommend that the mixture be made into a paste with water, and after drying on a water-bath that it be then exhausted with ether. This is better, but neither of these methods were satisfactory.

Finally, 30 c.c. of a well made fluid extract of the same coca was thoroughly mixed with 8 grams of caustic magnesia in a capsule, and the mixture dried on a water-

bath and powdered. This powder was then exhausted—one part by ether and the other part by chloroform, exactly as in the method given, both parts giving very slightly higher results. As a check upon the results the solution of alkaloid washed out was titrated with normal solution of oxalic acid.

From all this it would appear that this inferior coca of the markets, or rather the best that can be selected from it, yields about the same proportion of the alkaloid as was obtained by Niemann and Maisch, but it has been shown that, by the older processes of assay used by them, much of the alkaloid was probably lost or destroyed, and that much better results are generally obtained by the modern process.

Now, since 3 drachms of this coca, or 3 fluid drachms of its fluid extract gave the same physiological, or perhaps, therapeutical, effect as 3 grains of caffeine, and as the 3 drachms contained about ·45 grain of cocaine, it follows that cocaine is about 6·5 times more effective than caffeine, but it also follows that the coca accessible, and even the very best coca, contains very much less of its alkaloid than those articles which yield caffeine do of that principle.

Having gone thus far with coca which it is proposed to abandon for the present, at least, and to substitute for it a better agent, the next step was to investigate that agent, namely, tea, in the same way.

THE NOYAU OR NOYEAU VINE OR PLANT: IPOMŒA SINUATA, ORTEGA.*

BY W. FERGUSON.

For several years past, when driving through Colombo with any stranger, I scarcely lose an opportunity of attracting attention to a very common and abundant exotic climber which grows everywhere here, and often covering fences and small houses with a mass of dissected green leaves and large white flowers with cerise centres, and one of the best quick-growing plants to cover an arbour or to conceal small outhouses. I attract particular attention to this plant by pulling some of its leaves, crushing them between the fingers and then presenting them to my friends, and asking them what the odour reminds them of, when the reply is variously given as "Noyau," "Cherry Pie," "Heliotrope," "Prussic acid" or "Bitter almonds." My reply is: "This is the noyau plant, and this is a practical lesson in botany."

Although the plant is alluded to in several works on botany as producing noyau, I had not noted the fact until Mrs. O'Brien, the wife of General O'Brien, attracted my attention to it at Braybrooke Hall, saying: "This is what we call the noyau plant in the West Indies," at the same time giving me the lesson of crushing the leaves, which I have not forgotten, and which I now have the pleasure of recording for the benefit of the readers of the *Ceylon Observer* and of the *Tropical Agriculturist*.

What the liqueur sold as noyau is really composed of is as doubtful as the composition of most other liqueurs, judging by the various accounts, some of which I here give; but that noyau, pure and simple, is manufactured from the *Ipomœa sinuata*, Ortega, is distinctly recorded, and from no other source, as far as my information goes. Noyau appears to be a liqueur *flavoured* by several vegetable products, and this is about all the information which I can find in all the books I can refer to in Colombo.

The *Ipomœa sinuata*, from which noyau is said to be made, was originally a native of Georgia and Florida, but was introduced many years ago to Asia from tropical America, and is now found in N.W. India, Hindostan, Bengal and Ceylon, and is cosmopolitan in the tropics. It is properly the *Ipomœa sinuata* of Ortega, and has been described as *Convolvulus dissectus*, Linn., *Ipomœa dissecta*, Choisy, and has been figured by Jacquin, 'Hort. Vindob.,' ii., 74, t. 159, and is described by C. B. Clarke in the 'Flora of British India' (vol. iv., p. 214), in Baker's 'Flora of Mauritius' (p. 207), and Don's 'Gard. Dict.' iv. (p. 297).

As stated above, it is a most common plant in Colombo, and to persons going into the Fort through Slave Island, I may call their attention to a plant of it which some weeks ago covered the entire roof of the last house on the right-hand side (before crossing the railway) of the married quarters of the non-commissioned officers of the Royal Artillery; but since the south-west monsoon has set in, this plant is somewhat curtailed in its dimensions. It was introduced to Ceylon before 1824, according to Moon's 'Cat. Ceylon Plants' (p. 13).

The following are the extracts referred to above:—

Convolvulus dissectus abounds in prussic acid, and is one of the plants from which the liqueur noyau is prepared.—*Bot. Mag.*, 3141; Lindley's 'Vegetable Kingdom,' p. 631. The kernel of *Cerasus occidentalis* is used for flavouring the liqueur noyau.—Lindley, *l. c.*, p. 558. *Ipomœa sinuata*, Ortega, the Noyau vine.—Schomburgh's 'Barbadoes,' p. 612, No. 655. The statement in Eng. 'Cyc. Nat. Hist.,' ii., p. 130, that noyau is got from *Ipomœa panduratu* is a mistake. *Convolvulus dissectus* abounds in hydrocyanic acid, and is said to be one of the plants from which the liqueur noyau is prepared.—Maunder's 'Treasury of Botany,' i., p. 326.

Noyau (Fr.), a liqueur flavoured with the kernels of *Cerasus occidentalis*; it is also said to be sometimes prepared from *Convolvulus dissectus*.—Maunder, *l. c.*, ii., p. 794. The kernels of species of *Cerasus* impart flavour to noyau, ratafia, cherry brandy and maraschino.—Balfour's 'Class Book of Botany,' p. 806.

Noyau, a rich cordial, flavoured with the kernels of the nuts of bitter almonds, or of peach stones.—'Imperial Lexicon,' ii., p. 140.

Noyau, a name in France of a liqueur said to be prepared from the kernels of *Cerasus occidentalis*, a tree of the plum family (*Drupaceæ*), native of Jamaica, where it is called laurel. It is more than probable that the kernels of the common cherry are also used in the preparation of noyau, and it is said that a species of convolvulus (*C. dissectus*) furnishes material from which the liqueur is made. Noyau is chiefly used for flavouring confectionery.—Smith's 'Dictionary of Names of Common Plants,' p. 289.

To Dr. Trimen I am indebted for the following extract from the *Botanical Magazine*, which shows that the *Cerasus sphænocarpa* is the noyau cherry of the West Indies, which in some way, not known to me, has got mixed up in this respect with the *Cerasus occidentalis*:—"In the preparation of *noyau* probably several different vegetables are employed which contain prussic acid. A species of bindweed, the *Convolvulus dissectus*, abounds in prussic acid, and to that degree, as Dr. Nicholson of Antigua informs me, that 'if this medicine shall be found deserving the high character which some physicians have bestowed upon it, it may become valuable in a country where this prussic acid cannot be preserved many days in a pure state.' Hence this is a frequent ingredient in the preparation of noyau."—Hook., in *Botanical Magazine*, t. 3141. *Cerasus sphenocarpa*, Noyau cherry of West Indies.

From plants of the *Ipomœa sinuata* growing on fences in Union Place, the following notes are given:—Stems, petioles and lower parts of peduncles covered with long hairs; leaves palmate, glabrous or nearly so, cut down nearly to the centre into seven lanceolate, deeply toothed or pinnatifid lobes; peduncles one to four flowered, and with the flowers together about the same length as the leaves; sepals elliptic, oblong, obtuse with a minute cusp, glabrous, fleshy, inflated before the fruits are ripe, then papery and spreading; flowers shallow, funnel-shaped, about two inches across, white with cerise

* From the *Weekly Ceylon Observer*, July 9, 1884.

throats; capsule about half-inch diameter, glabrous, two-celled, normally four-seeded, inflated and divided into four parts; seeds black, glossy, smooth. The flowers begin to open about 10 a.m. in Colombo, and are open nearly the rest of the day.

DIETETIC DELUSIONS: THEIR DELETERIOUS EFFECTS, AND THEIR RECTIFICATION.*

BY R. M. HODGES, M.D.

(*Concluded from p.* 110.)

Broths, however, that is, soups which contain large quantities of solid matter, disintegrated meat,† vegetables, macaroni, vermicelli, *pâte d'Italie*, rice, barley, sago, tapioca, etc, are often, and in proportion to the consistency thus given, excellent alimentation. They are palatable and easily consumed in considerable quantities at a time. *Soupe à la Reine purée de gibier*, various vegetable *purées*, chowder of fish, *bisques* of oyster, clam, lobster, are illustrations of the perfection of this kind of cookery. That they may be what is sometimes called "rich" is no objection. The digestive powers of the underfed are usually good, though the owners of them may not think so. They are apt to be active and ravenous even if the appetite is not.

Notwithstanding its capacity to digest there is, invariably, something repulsive to an insensible stomach in what are conventionally called "roasted joints." This antipathy, together with considerations of convenience as regards the size of portions to be cooked, makes it almost imperative for protesting but frequent eaters that meats should be either broiled or stewed; and steaks of various kinds, chops, cutlets, chicken, game, some kinds of fish, and shell fish, become, therefore, the only really available resources of the caterer for an ill-ordered appetite. And yet no more difficult undertaking can be given non-hungry patients than that of eating beefsteak. Apart from its somewhat uncertain quality nothing requires more mastication, and the class named always declare that there is no item of food of which they are already more "tired." Any other variety of meat, mutton, veal, venison, etc., cooked in the form of steak, is more readily eaten. The short, compact fibre of mutton chops, especially those from the loin, makes them less likely than beefsteak to be badly cooked, and far easier to be consumed. Well-selected, carefully-cut lamb chops, in their proper season, are a delicacy of the highest order, and rarely fail to be appreciated by the most benumbed eater.

Meats stewed, or semi-stewed, and then partially browned in the oven (braised, as it is called in the language of cookery) are attractive and submissive preparations, and this method of cooking is an excellent one for purveying small portions of animal food. In the various forms and denominations of stewing and braising the *cordon bleu* finds scope for the highest aspirations of culinary art.‡ They impart an appetizing flavour to viands cooked to extreme tenderness, the perfection of these methods being found in their application to sweetbread, a costly luxury, but an article which, by its slight demand for mastication and its nutritious qualities, is peculiarly adapted to the requirements of an invalid eater. Others of the viscera, besides the pancreas and the thymus gland, namely, the brains, the liver, the kidneys, the testicles of lambs, successfully lend themselves to this process of cookery, and, like calves' heads, pigs' feet, and sheeps' tongues, are converted into delicate and easily assimilated nutriment for those who are ignorant of, or can overcome, the associations which they suggest.

Of various mechanical processes available for rendering food easily eaten preparatory mincing offers great advantages, and is particularly applicable to chicken and veal. A common and attractive method of serving both in the form of minced meat is that of *croquettes*. I am at a loss to know why veal is so often proscribed rather than prescribed. Its chief defect is in being a lean meat, containing more water and less fat than mutton or beef, and consequently of subordinate nutritious value. It is, however, the standard meat of France, as beef is of England, and properly chosen veal, from large calves, is open to no dietetic objection which I am aware of except the difficulty of cooking it well. It is not less digestible than other young meats, and if occasionally "poisonous" it becomes so from decomposition, which, in the season of its abundance, more readily takes place from keeping, or changes in the weather, than is the case with meats of maturer growth. But this, like poisoning by partridges which have been too long kept in winter time, is an inexcusable accident.

In spite of the somewhat flippant assertion of a justly distinguished medical writer "that there is a growing incapacity to digest fat which is truly alarming," I do not hesitate to assert that of all the modes in which minced meat may be presented the calumniated and much-libelled sausage is, in winter time, one of the most useful and successful articles for frequent feeding. Lean and fat meats, more digestible together than separately, are discriminately mixed in the compact and appetizing form of this ubiquitous and popular comestible, the sole secret of whose easy digestion is that it should not be eaten except when it has become thoroughly cold after cooking. Bread and butter can be tolerated with complete immunity when hot buttered toast would provoke exasperating dyspepsia, and it is exactly thus that sausage cold stands in relation to that which is served hot. Presenting the albuminates and fat in an economical, savoury form, easily obtained and made ready for consumption, sausage, in some countries, might almost be said to have become a national food and it offers to the fastidious or indifferent eater an article of diet from which great benefit may be derived. A trial of this stigmatized edible will be followed by a ready recognition of its alimentary value in the class of cases under consideration.

As has been remarked already, food to be taken outside the conventional meal hours must be of a kind easily obtained anywhere, readily "kept in the house," and which does not demand preparation or delay. Few persons can command the services of a "professed cook," or of a good "plain" cook, or have either at their disposal every two hours in the day. The practical articles of diet which meet these restricted requirements of convenience are few, and of these the chief in importance are eggs, milk, cream, butter, and bread.

"Raw albumen is one of the most digestible of foods; coagulated, it is comparatively indigestible."* Eggs to be easily digested must be eaten uncooked, since albumen under prolonged heat acquires progressive degrees of toughness.† When cooked, buttered, salted, and peppered they are soon tired of as articles of food, and alleged to be "bilious." Cooking, moreover, involves waiting and preparation. An uncooked egg is always ready and at hand, is clean to be kept

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* Read before the Boston Society for Medical Improvement, June 9, 1884. From the *Boston Medical and Surgical Journal*, July 10, 1884.

† The meat from which soup is made allowed to become cold, should be pounded to a paste in a mortar, and then returned to the soup. Veal, pigeon, and rabbit are especially adapted to this procedure. "French" cooks prefer to make "chicken broth" from rabbit.

‡ The details of braising and other refined culinary processes are feelingly particularized by Sir Henry Thompson, in 'Food and Feeding.' Third edition. London, 1884.

* Twining, p. 184.

† Eggs should not be cooked by boiling but by placing them in hot water, and allowing them to remain there from seven to ten minutes.

anywhere, and scarcely needs to be broken into a glass. With a little knack it may be swallowed direct from the shell, as most persons know if in childhood they have had access to country barns. A raw egg weighs from two to two and a quarter ounces, and is said to contain about the same flesh-forming and heat-giving material as an equal amount of butcher's meat.* It offers in perfection the quickest and neatest mode of taking a large equivalent of substantial and nutritious food at a swallow. Every bar-room realizes this, and supplies its counter with a bowl of eggs. The steady drinker, who has eaten nothing for breakfast and has no appetite, but knows the injurious effects of a drink on his empty stomach, can crack an egg, quickly dispose of it, and justify himself for an early dram. Even "soda shops" appreciate their value, and dispense them with lemonades and phosphates. Beaten-up eggs are the certain provocative of dyspepsia. When subjected to this process with the infinite painstaking of an attentive friend or nurse an inviting draught of creamy froth is brought to the unfortunate recipient,—a tumbler full of air, which has been introduced in the largest possible amount to a given quantity of egg, milk, wine, sugar, and nutmeg,—than which nothing could be better devised to promote indigestion, abominable eructations, and the most uncomfortable flatulence or acidity. Every beer drinker has the good sense to blow off the "head" of his mug of beer, or to wait patiently for the froth to subside, before he imbibes the draught; and if crochety persons will not learn the trick of swallowing an egg whole, they can compromise the difficulty by slowly stirring the white and the yolk, which may be thus mixed together and made to seem a less revolting dose without the incorporation of air by beating. Taken as medicine, and looked upon as such, eggs are at least equally palatable with cod liver oil, for which they offer an equivalent substitute, adapted to winter or summer, as the latter hardly is, and are far more readily digested. There is no limit to the number which may be taken with advantage continuously and for months at a time. Eighteen eggs are required to furnish the flesh-forming materials and other nutrients sufficient for the various needs of an adult man in one day. No more striking illustration of their concentrated food value, or a better proof of its general appreciation, can be given than the statement that during the first quarter of 1876, in Great Britain, the consumption of eggs reached the enormous number of seventeen and a quarter millions.† Fifteen millions were imported into the United States from Europe in the year 1883. It is but fair, however, to remember that a vast number of eggs, are used in the arts, especially photography, and in manufacturing processes.

Milk and cream are convenient and therefore important and desirable articles of food. It is a common assertion of patients that milk "always disagrees with them,"—that they have "never be able to take it." This statement, which, as a rule, may safely be attributed to mere prejudice, is also in some cases a true one, simply for the reason that the milk is drunk too rapidly, or because it is not rich enough, an easy remedy being to take the given quantity more slowly, or to increase by addition the amount of cream which the milk naturally possesses, the trouble being due, in the first instance, to the fact that a large and solid cheese curd is suddenly formed in the stomach by the rapidity with which the milk is deposited in that organ, and in the second, to the hardness of the casein derived from milk with an insufficient percentage of cream, which is always inconstant in amount (varying between 10 and 15 per cent.) or in composition, the water alone ranging from 45 to 65 per cent.‡ Milk is often too poor, but never too rich, for purposes of enforced nutrition, and the fact is incontrovertible that it is the model food for digestibility.* By adding cream to milk the amount of fat is increased and the curd is softened; and its digestion can be still further facilitated by the disintegration of its coagula, accomplished by crumbling into it bread, cracker, etc., or by the addition of a small amount of cooked meal or flour. By this latter means cold milk is made warm, which gives it an increased efficacy. This end may also be attained and the distastefulness of warm milk removed by flavouring it with the preparations of cocoa, weak coffee, or some of the inert substitutes for the latter sold by grocers, the best of which, it has seemed to me, is known as "new era coffee," consisting simply of roasted and ground wheat. But, as hot milk demands a certain amount of trouble, cold milk alone, or with bread broken into it is, after all, the only practical resource so far as its use for frequent nutriment is concerned; and two quarts of milk, or three pints of milk and one pint of cream, are not more than the minimum quantity desirable for ingestion in twenty-four hours. Clear cream may be administered in doses of a wineglassful after each meal, as any other medicine might be, and a great deal can be disposed of by eating it liberally added to cooked fruit and various dessert dishes. *Blanc mange*, Italian cream, and the various forms in which many delicate farinaceous articles are cooked, may thus be made more eatable through the zest given them by this accompaniment. There is a great difference in the palatableness as well as digestibility of cream which is obtained from milk by centrifugal force, as is largely done for the market, and that which is skimmed after "setting." This distinction should be borne in mind in prescribing cream which is to be taken uncooked. The last-named product is by far the most desirable article.

Very few patients, especially women, drink a sufficiency of water to maintain their health or an adequate nutrition. Water is an important constituent of food; is indeed, the carrier of food into and through the system, and forms more than two-thirds of the whole body. Neglect to keep up the supply of water leads to a diminution in the quantity of blood, and lessens the body's strength.† When it is remembered that there are daily eliminated from 18 to 32 ounces of water from the skin by perspiration, 11 ounces from the lungs, and 50 ounces from the kidneys, it is easy to see that the amount consumed by many persons falls short of the demand, and that their bodies must be insufficiently supplied with the requisite degree of moisture; some 66 ounces of water alone and in tea, coffee, beer, etc., being required for a daily supply over and above that which is contained in the solid food of a full ration to make good the average regular waste.‡ The constipation which is so common in ill-nourished persons is largely due to a want of liquid in the intestinal canal. This, therefore, will be ameliorated by the free use of

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* Church, p. 147.
† Church, p. 148.
‡ Church, p. 136.

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* The analysis of "market" milk sold in Philadelphia and New York is as follows:—

Water	87·7 per cent.
Total solids	12·3 per cent.
Total solids, not fat	8·48 per cent.
Fat	3·75 per cent.
Milk sugar	4·42 per cent.
Albuminoids	3·42 per cent.
Ash	0·64 per cent.

—A. R. Leeds, *Medical News*, July 21, 1883.

† The characteristic thirst which attends great and sudden losses of blood is a symptom of interest in this connection.

Some valuable comments on the therapeutic uses of water, by Mr. Lauder Brunton, may be found in the *Practitioner*, May, 1884.

‡ Church, p. 51.

water, as is also the constipating tendency of milk which is sometimes complained of, the curds being liquefied and reduced in size, and thereby made more readily digestible. Its effect on hardened fæcal masses or accumulated mucus in the intestines is equally obvious, and explains in part the intention as well as the success of the hot-water craze at present so popular.*

The underfed are benefited, and the process of feeding is helped, by alcohol. But the amount of alcohol which such persons may take as a food adjunct with advantage is very small. The cumulative effects of a medicinal dose at stated intervals are of greater utility than the more instant result of a larger allowance swallowed in a single drink. A measure of alcohol which produces an effect quickly, that is, which flushes the face, or exhilarates, as a sherry-glass of wine does with most females, for instance, is a toxic dose, and will be followed by reaction. It is a quantity short of this which is allowable. A teaspoonful, or at most a dessertspoonful, three or four times a day, is usually as much as can be borne without such sequelæ as are above alluded to. Spirits serve their purpose better than wine, for the reason that the relative quantity of alcohol administered is more measurable. Wines vary in strength; spirits are comparatively uniform. Tinctures even, or elixirs, may be given when spirits are objected to either on principle or from prejudice. In any case there should be a large dilution with water, as a more gradually stimulating effect is thus produced. Alcoholic medicines ought never to be taken on an empty stomach.†

The subject of bathing, incidentally alluded to, leads me to call attention to the fact that cold baths chill down the feeble circulation of the badly nourished, and provoke a physical torpor which is obstructive to the processes of nutrition. They drive the blood from the surface of the body in upon vascular organs, whose circulation is already sluggish from general weakness. They thus produce discomforts which aggravate existing languor, and enhance the feeling that food and drink ought not to and therefore cannot be taken. A bath described as one "from which the chill has been taken" is too cold for subjects under medical advice who are in need of extra feeding. Great pains should be taken to discountenance everything which reduces the bodily heat, and employments or amusements which in any sense tax the strength ought to be abandoned when a forced diet is attempted. Even ordinary exercise is often objectionable, and its complete discontinuance sometimes so important that confinement to bed is a necessity. Those who raise animals are practically made aware that a restless disposition is fatal to successful growth in vigour and flesh. The truthfulness of this observation is equally apparent with human beings who need "building up" in the literal sense of these remarks.

* There was perhaps more common sense than Martin Chuzzlewit supposed in the American habit, prevalent when people lived more frugally, and went to bed with empty stomachs oftener than nowadays, which he noticed in his fellow boarders at Mrs. Pawkins', "who, after taking long pulls from a great white water jug upon the sideboard, and lingering with a kind of hideous fascination near the brass spittoons, lounged heavily to bed." Water drinking was indulged in thirty years ago more than at present, and in the half-starved existence which bred the lank and conventional type of American in those days, I cannot but believe that the comfort and well-being of the then living community were greatly promoted.

† There is much pragmatical talk about "pure liquors," and the difficulty of obtaining them. It may be questioned whether alcohol and water, except for an educated and fastidious palate, is not as wholesome for medical uses as any high cost wine or spirit. Noxious impurities, when they exist, are usually owing to imperfect distillation, or lack of age, rather than to deliberate "doctoring."

Mere fattening is not the object of full feeding, but it is to a certain extent its necessary accompaniment. The motive of the measure, as has already been stated, is to add to the quantity and quality of the blood, and it is hardly possible for an individual to grow fat without a decided increase in the volume of his blood. Weighing at stated intervals is therefore an important procedure, and there is no other way to make sure that the subjects of treatment are sufficiently well fed to gain blood. Persons who put on fat rarely fail to improve in colour; their comfort is enhanced; warmth of body is gained, in itself no slight improvement; the pulse becomes fuller; the cheeks grow redder; the spirits are raised; the general mien becomes brighter; and these phenomena are explainable only by admitting that there has been an accession to their stock of blood. The scales thus become a thermometer of improving health and strength, by the aid of which the physician measures the progressive results of his regimen. Like the "pass-book" used at banks, they reveal in a ready and serviceable way the healthful standing of an individual, the relation of his resources to the wear and tear checks which he is continually drawing, and whether his account is nearly or quite overdrawn or superfluously plethoric. They ought not to be put into requisition too frequently, and only when there is reason to think that an encouraging increase of weight has taken place. This should manifest itself soon after systematic feeding has begun, and continue at the rate of two pounds a week, or not less than one pound, so long as improvement seems desirable, or until a weight has been reached the minimum of which shall be equivalent to two pounds for each inch of stature.

Experience and observation have universally confirmed the expediency of a heartier and more systematized diet than recently prevailed. Its utilitarian advantages are publicly recognized. Within twenty years the rations of armies, of institutions, charitable, penal, and medical, have been liberally increased. Family habits in regard to eating, since the flush times of the Civil War, have greatly changed, and the large allowance of food requisite for the maintenance of a sound health can scarcely be exaggerated in any statement of its details. In the application of this accepted dogma to special and personal cases there is much, however, still left to be desired.

I cannot better conclude this paper than by a paraphrase of Mr. Clifford Allbutt's words in his recent Gulstonian lecture,* wherein he observes, although not precisely in the language which follows, that: Under the benign and self-controlling influences of an amended nutrition the domestic atmosphere changes. Sore throats and trivial indispositions which once raised the frequent suggestion of a conflict with school, or a dinner, or an evening party, no longer present themselves as subjects for anxiety. Headaches and vague, transitory pains disappear. Ill temper, fretfulness, the fidgets, crying-spells, shrewishness, sleeplessness, listlessness vanish away, and the complaint of being "good for nothing" ceases to be made. By the building up of digestive resources a reserve of strength, which never before existed, is created, or a wasted one is restored, not merely for use on great occasions, but, by its wisely managed expenditure, to serve permanently for the silent work and equable running of vital machinery. Convince underfed invalids that no further defalcation of diet or new combination of drugs is needed; that, instead of waving dishes aside, like the physicians of Sancho Panza, they should be indulged in liberally, and they will find health within their reach; and by careful advances and the frequent repetition of small and highly nutritious meals realize that they can steadily eat their way upwards to a regenerated and tranquillized condition of body and mind.

* *Lancet*, April 5, 1884, p. 605.

The Pharmaceutical Journal.

SATURDAY, AUGUST 23, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE REVISION OF THE PHARMACOPŒIA.

A FORTNIGHT since we referred to the subject of Pharmacopœia revision, and quoted a letter from Dr. FARQUHARSON which had appeared in the *British Medical Journal* as indicating that in respect to that portion of it which is the special province of the medical profession—the determination of the articles of materia medica and preparations that the Pharmacopœia shall contain—considerable diversity of opinion existed. Our remark has since found abundant justification in some correspondence that appeared in the same journal last week. In a forcibly written letter, Dr. T. LAUDER BRUNTON expresses agreement with Dr. FARQUHARSON'S wish to relieve the overburdened medical student from the necessity of acquiring a knowledge of so large a number of officially defined remedies as are at present contained in the Pharmacopœia; but he objects to an attempt to attain such an end by cutting down that work He points out, very properly, that the British Pharmacopœia is not a student's text-book, but a description of those drugs which are most generally approved of and employed by the medical profession, and that although many of them may be regarded by some persons as useless, yet by others the same articles are considered to be valuable remedies and prescribed constantly. Of the truth of this latter proposition there can be no doubt, and it finds an illustration in a letter from Dr. HERSCHELL, who, while agreeing with Dr. FARQUHARSON as to the necessity for "a drastic and thorough overhauling of every page" of the work in question, thinks that gentleman has been unfortunate in his choice of examples for elimination, and especially in singling out krameria, serpentaria and chloroform water, and associating them with the phrase "other rubbish of the kind." Dr. BRUNTON would prefer to meet the difficulty as to the overtaxed medical student by limiting the number of drugs concerning which he is expected to show a proficiency in knowledge, and certainly it would be a new feature in Pharmacopœia revision if it had to be regulated by the exigencies of the examination room. But the final decision upon this subject must lie with the medical profession, and it is one upon which the pharmacist is hardly called upon to express an opinion.

When we turn, however, to another portion of Dr. BRUNTON'S letter, in which he urges the introduction into the British Pharmacopœia of more preparations that shall be "not only useful as remedies but agreeable to the palate," we come upon a subject with which the practical pharmacist is specially qualified to deal, and one furnishing an opportunity for the application of the scientific principles and manipulative skill which are as characteristic of his training as a knowledge of surgery or therapeutics is of that of the medical practitioner. Dr. BRUNTON fears that the physician's prescription fails too often because the taste of the mixture he prescribes is so disagreeable that the patient cannot or will not take it, and he considers this to be one of the causes of the increasing consumption of patent or proprietary medicines, these being either prescribed by medical men, or bought without a prescription by those patients who prefer a pleasant medicine to the "nasty stuff" which the doctor is likely to prescribe. As illustrations of his meaning, Dr. BRUNTON mentions the substitution of sugar of milk for sulphate of potash in the formula for DOVER'S powder in the United States Pharmacopœia, and the introduction into the same work of the class of abstracts, consisting of the active portion of powerful drugs diluted with milk sugar, as well as an elixir which forms a convenient and agreeable vehicle for a number of remedies. Dr. BRUNTON thinks it would be well to follow the example shown in this respect by the United States, and he prognosticates that unless something be done to render it easier for medical men to prescribe mixtures that shall be palatable as well as active, the sale of proprietary medicines is likely to increase rather than to diminish. Dr. HERSCHELL also refers to the fact that many of the official processes are becoming more or less superseded by special processes followed by certain manufacturers which yield products that meet with much favour. Indeed, it would be idle to attempt to ignore the advance made in the direction of "elegant pharmacy" during the last dozen years, and one of the problems compilers of future editions of the British Pharmacopœia will have before them for solution will be to decide as to the extent to which this form of toothsome medication can be made compatible with science in medicine and pharmacy. It is the competence of pharmacists to advise in respect to this and similar points which gives them an indisputable claim to constitute a part of any committee entrusted with the work of Pharmacopœia revision. In the words used by the President of the British Pharmaceutical Conference at Hastings last week, pharmacists as a body know more about the best modes and practical niceties involved in the preparation of medicines than any other body of men in the country. Although we think, therefore, that the continued exclusion of persons possessing this know-

ledge from the body controlling the Pharmacopœia will not have the effect of altogether putting elegant pharmacy under a bushel, we agree with Dr. Brunton in looking forward in that case to its further development in the undesirable form of extra-pharmacopœial preparations. We notice, also, that in this correspondence one of the writers anticipates the challenge of Mr. Schacht that if medical men desire standardized preparations they should ask for them. Dr. Herschell claims that the time is not far distant when the old standard based upon the variable crude drug must be abandoned, and a new one adopted based upon the actual amount of active ingredient contained in the preparation. The liquid extract is a form of preparation which he would adopt much more extensively, and he evidently considers that in this respect the United States is far ahead of Great Britain; but we cannot agree with him that the extractum cinchonæ flavæ fluidum, U.S.P., is a particularly fortunate selection as a type of a precise preparation "presenting the active ingredients in the grouping in which they exist in the native drug."

Before leaving this subject we may again refer to the growing disposition evident in the medical profession to follow the lead of pharmacists in attempting to secure a reform in the composition of the Pharmacopœia Committee. Probably most pharmacists were under the impression that the preparation of the Pharmacopœia was already too exclusively in the hands of the medical profession. But, be that as it may, the proceedings at Belfast and the remarks upon them in the *British Medical Journal*, which we recently quoted, imply a different conclusion. Since then the same position has been taken —at least indirectly—by the *Medical Times*, in expressing a hope that the anomaly of a new pharmacopœia being produced for the use of the practitioners of the country without their even having a voice in its revision is one of the things of the past, and in applauding the use of the organization of the British Medical Association in securing the representation of the general profession upon the Pharmacopœia Committee. The question, however, naturally arises, If the Pharmacopœia Committee as at present constituted represents neither the members of the medical profession nor pharmacists, whom does it represent?

When speaking recently (before, p. 112) of the marked exacerbation in the discussion of the Patent Medicine Act which has followed the step of the Inland Revenue authorities in placing certain foreign proprietary preparations under the same rules as English ones in respect to stamping, we referred to what appeared to us to be a remarkable misconception of a writer in the *Times*, professing to be a medical man, with respect to the manufacture of alkaloids. A day or two afterwards Messrs. Howard and Sons made the reasonable suggestion that the "Member of the Royal College of Physicians" was not fully aware of all the circumstances of the case, since the manufacture of quinine, morphia, strychnine and atropine is an important English industry. Of course so positive a philosopher could not admit, even under the shield of anonymity, that he had made a mistake. Acknowledging in his reply that "some" alkaloids are prepared in this country from imported raw material, he reiterated his statement that the most reliable sources of the alkaloids are the foreign houses, and added that it is far better that the actual preparations should be imported than that English factors should have to import the raw material and work it up in this country. Finally he expressed his sorrow that so rotten an Act should be supported by such a firm as Messrs. Howard and Sons, which probably will have its due weight with that firm. We wonder whether this gentleman imagines that there is a cinchona alkaloid industry in Bolivia, or that there are cinchona forests in Germany! Or does he fancy that morphia has ever yet been manufactured where the poppy is grown? Not the least curious incident in connection with this correspondence is that a usually well-informed medical contemporary refers to the original letter as "particularly forcibly written," and quotes with approval the passage relating to the alkaloids.

* * *

The inquiry into the supposed fatal mistake in a French pharmacy in the dispensing of morphine hydrochlorate for quinine hydrochlorate in a suppository, which it was alleged had caused the death of a child (see before, vol. xiv., p. 942), has resulted in the assistant, who is a pharmacien of the first class and reputed to be a careful dispenser, being convicted and sentenced to a month's imprisonment and a fine. Much sympathy is felt for the assistant, the circumstances being not at all free from obscurity, and the "Chambre Syndicale des Elèves en Pharmacie de Paris" has met and drawn up a petition for presentation to M. Grévy asking for a remission of the sentence.

* * *

On Thursday, the 14th inst., one hundred and nineteen ounces of sulphate of quinine and seven hundred ounces of valerianate of quinine, of the make of the Fabbrica Lombarda di Prodotti Chimici, Milan, were put up for sale at the London Commercial Sale Rooms in Mincing Lane. Some portion was sold privately, and the remainder realized prices varying from 3*s.* 6*d.* to 3*s.* 9*d.* an ounce.

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In view of the interest which the epidemic of cholera in the south of France and the north of Italy is arousing in this country, and of the possibility that the disease may make its appearance here, the National Health Society has issued a leaflet containing plain instructions for heads of families and others "How to Prevent and Oppose the Cholera." The last page is intended to be devoted to supplying information respecting the Medical Officer of Health and the Inspector of Nuisances of the district in which the leaflet is intended to be distributed. The leaflet is published at the price of one penny, but the Society is prepared to issue copies at a smaller charge when a quantity is taken, and it has been suggested that some chemists and druggists might feel disposed to become the agents for the sale in their respective localities. Respecting this matter further information may be obtained from the Secretary, Mr. F. Lankester, 44, Berners Street, Oxford Street, W.

British Pharmaceutical Conference.

TWENTY-FIRST ANNUAL MEETING.

(*Continued from page* 139.)

The next paper read was a—

Final Report on The Alkaloidal Value of Cultivated and Wild Belladonna Plants.

BY A. W. GERRARD, F.C.S.

This communication is a continuation of work concerning which two previous reports have been made. In the first of these it was shown that the wild belladonna contained more alkaloid than the cultivated, also that the alkaloid was generally more abundant in the leaves than in the roots. In the second report it was pointed out that belladonna attains its most active or highest state of development, as regards alkaloid, at the period of flowering.

The preceding results having been arrived at by a limited number of analyses, it was considered desirable they should receive further confirmation; likewise that the second, third, and fourth years' growth of belladonna should be submitted to analysis, the objects being to ascertain if any notable differences would be found in the alkaloidal yield of the plants at these various ages.

Through the kindness of several friends I have been able to obtain an ample supply of cultivated belladonna; in addition, I have grown some plants in my garden in London from roots sent me by Mr. Ransom, of Hitchin. In obtaining a proper supply of wild belladonna I experienced some difficulties; excepting a few sent me from Yorkshire the plants were of my own collecting, and gathered in Sussex, Surrey, and Warwickshire. No special month can be fixed for collecting the plants, as this should be done at the period of flowering, which has been shown to be the time of highest activity. The flowering of the plants varies with the seasons, sometimes commencing in May and passing into July. In all cases the plants selected for examination were average flowering specimens, of fairly uniform growth.

The method of conducting the examination of the plants has been as follows:—The leaves and roots were carefully separated from the stems, dried at 100° to 105° F., then separately reduced to fine powder. For each analysis 50 grams of the powder was taken, a parallel experiment being conducted as a check in each case. Exhaustion of the powder was completed with alcohol, the alcoholic extract dissolved in water and filtered from the insoluble resinous matters; the aqueous portion now treated with ammonia in excess was well shaken with ether. Upon separation of the ether it was allowed to rest a few minutes that excess of ammonia might escape, then shaken with dilute acetic acid, when an aqueous substratum of acetate of the alkaloids separated: this was treated a second time with ammonia and ether; finally the ether gave on spontaneous evaporation the alkaloid in the form of a pale-brown or yellow crystalline mass.

The quantity of alkaloid in the residue was determined by the process described to this Conference two years ago, that being to exactly neutralize the residue with sulphuric acid standardized so that 100 c.c. equals or makes neutral 1 gram of pure atropine.

To test the accuracy of the forgoing process, I worked out gravimetrically a titrated solution of the sulphates of the alkaloids equivalent to 1 gram of atropine, and after two separations by ammonia and ether, obtained, when dried at 100° F., ·961 grams of nearly white crystals of alkaloid. This shows a loss of 3·9 per cent., which may be attributed to the mechanical steps of the process. This method of analysis has given me the highest satisfaction; it is easily conducted, and I believe, very accurate.

Percentages of Alkaloid from Wild Belladonna.

Age of plant.	Yield from root.	Yield from leaf.
2 years	·260 per cent.	·431 per cent.
3 „	·381 „	·407 „
4 „	·410 „	·510 „

Percentages of Alkaloid from Cultivated Belladonna.

Age of plant.	Yield from root.	Yield from leaf.
2 years	·207 per cent.	·320 per cent.
3 „	·370 „	·457 „
4 „	·313 „	·491 „

The above tables represent twenty-four analyses, two having been carried out in each case; the percentages given are the average. Besides these I have made fifteen other analyses, or thirty-nine in all, a number I believe sufficient to furnish the information sought. If the sum of the percentages be divided by the number of analyses, the answer will show the average alkaloidal yield of root and leaf on the whole number of analyses conducted in each case; thus the leaf of the wild plant gave ·449, the cultivated ·422 per cent.; the root of the wild gave ·350, and the cultivated ·296 per cent. It is evident from this result that the wild plant is the most powerful.

I referred to some plants I had grown in London. I have recently examined the leaves of these plants. The result shows they had not deteriorated in quality by their transference, for whilst the leaves of a plant when received fresh from the country gave ·433 per cent. of alkaloid, the leaves of the same plant grown in London yielded ·442 of alkaloid, showing a small increase. The leaves of the London-grown plants were not so finely developed as those of the country. They were pale in colour, and generally the plants were weaker; but it is of some importance to know that no falling off had taken place in the most useful constituent of the plant by transference to a new soil and atmosphere.

Whilst collecting wild belladonna I had noticed that many plants were produced from shoots, sometimes thrown out as runners from the crown of a root or developed from an exposed part of a root. On this point Mr. Holland, of Market Deeping, informs me:—"The plants from suckers you refer to are much more prone to rot than plants grown from seed." It is thus evident from this practical experience of a grower that the plant could not be successfully cultivated by division of the roots. Amongst the wild belladonna I have observed the recumbent variety first noticed by Mr. Holmes; an analysis showed it to contain the average quantity of alkaloid.

After a consideration of the results and bearings of the above experiments I have drawn the following conclusions:—

(1). Wild belladonna generally contains more alkaloid than the cultivated, but the difference is not so wide as to make it of any material consequence which variety is employed for the manufacture of pharmaceutical preparations. But for uniformity I suggest that they be made with the cultivated plant, the wild being retained for the preparation of atropine.

(2). With reference to the part of the plant richest in alkaloid, the leaf has been found to yield it most abundantly, the root, fruit and stem being the next in order. It would seem from this observation that preparations of belladonna leaf should supersede those of the root. But if we consider the great strength of liniment of belladonna, the only official galenical preparation made from the root, its comparative cleanliness, and the general satisfaction it gives to the medical profession, there is no good reason to advocate a change.

The expediency of introducing an alcoholic extract of belladonna leaves into the British Pharmacopœia

will, I believe, be generally acknowledged; such an extract is a necessity in most dispensing establishments where belladonna suppositories have to be made, and it certainly would supersede with advantage, in belladonna plaster, the extract made by the sadly unskilful process now official. Again, such an extract is well suited for making belladonna ointment. In the present formula there is no harmony or compatibility of ingredients; we have a mechanical mixture of extract, water and fat, soon passing into a state of mouldiness. On the other hand, were it made with an alcoholic extract it would be a perfectly homogeneous ointment of a most permanent character.

(3). It has been shown in a previous communication that belladonna of the first year's growth is a small plant, not worth collecting, containing but little alkaloid; from the second to the fourth year of its age, the plant shows a slight increase in strength. It is therefore evident that from two to four years of age and at the period of flowering the plant is in the best condition for use.

(4). The roots of belladonna may be collected at the same time as the leaves; a series of experiments having demonstrated that roots collected in May, July and September, contained fairly uniform quantities of alkaloid. From this we may assume that the growth of the leaf does not exhaust the root or remove from it any active principle, but rather that there is a simultaneous development of both parts.

I have not attempted in this communication to enter into a discussion as to the causes which may accelerate or retard the development of the active principles of belladonna, for such a discussion could scarcely lead to any very useful practical results, the study of such questions requiring not only the possession of a drug farm, but a vast amount of patience and devotion, combined with a lengthened period of observation, such as few pharmacists, however devoted they may be, would care to undertake.

I beg to thank most heartily the British Pharmaceutical Conference for its generosity in assisting by a grant the expenses incurred during this investigation, as likewise those friends who have sent me belladonna plants.

A vote of thanks having been passed to Mr. Gerrard for his paper, the President suggested the two following papers should be read before beginning the discussion:—

Report upon the Estimation of the Alkaloids in Atropa Belladonna.

BY WYNDHAM R. DUNSTAN

AND FRANCIS RANSOM.

In a paper communicated to the Pharmaceutical Society (*Pharm. Journ.*, [3], xiv., 623) we have shown that the salts of atropine and hyoscyamine which exist in the root of *Atropa Belladonna* can be very readily extracted therefrom by hot percolation with a mixture of chloroform and an equal volume of absolute alcohol. Chloroform alone was found to be an inefficient solvent, and alcohol alone to extract non-alkaloidal substances that are not extracted when chloroform is present. When the chloroform-alcohol percolate is agitated with water the whole of the alkaloidal salts are withdrawn while nearly all the colouring matter remains dissolved in the chloroform. When ammonia is added to the aqueous solution and the liquid agitated with chloroform the alkaloid is extracted and the small amount of colouring matter remains in the ammoniacal liquid. The purity of the atropine and hyoscyamine obtained by evaporating the chloroform was proved by converting the alkaloids into the periodides and by decomposing with sodium thiosulphate, when the regenerated alkaloid was found to coincide in weight with the residue originally operated upon. The special features that distinguish this process are: (1) It is simple and accurate; (2) a high temperature is avoided; (3) the solvent employed extracts a minimum of non-alkaloidal constituents; (4) no precipitants as such are used; (5) the use of acids is avoided; (6) the alkaloids are not heated with alkalies. Since the publication of these results we have been engaged in experiments upon the estimation of the alkaloids in the leaves of *Atropa Belladonna*, in the carrying out of which we have encountered many difficulties. Many of these have since been overcome and we hope early next year to be able to propose a simple method for estimating the atropine and hyoscyamine in the leaves.

A Few Notes on the Growth of Belladonna and Hyoscyamus.

BY T. J. HASSELBY.

The various papers read before this Association on belladonna by Mr. Gerrard, the one by Dr. Attfield advocating the culture of medicinal plants, coupled with the high price of hyoscyamus leaves, led the writer to try what could be done under ordinary circumstances by the country pharmacist. Belladonna and hyoscyamus were selected.

Having a small garden containing about sixty square yards which was a type of builders' gardens—where rubbish had been shot and veneered with a little earth—the attempt was made. The first difficulty was plants or seeds. The flora of the neighbourhood did not include the first; the catalogues of seedsmen were consulted but no mention was made of these, and wholesale houses who were applied to could not supply them. Through the kindness of a friend a plant of belladonna was obtained from North Yorkshire; it was well laden with ripe berries, which were sown; the plant being set under the shade of a south brick wall. A year ago last spring it was pleasurable to note the appearance of a number of seedlings which grew about a foot high and then died down on the approach of winter. This spring, as soon as they appeared they were dusted with slaked lime which had absorbed plenty of carbonic acid and a top dressing of Clay's chemical manure. Under this treatment they flourished and grew well, being now four feet high. The old plant made shoots last year three feet high, which died down. This spring, under the same treatment as the seedlings, it sent up half a dozen stems which average five feet high. Culpepper speaks of it as a dismal plant. It is the reverse, its fresh green colour being pleasing to the eye and better than bare brick walls to gaze upon. The plants are bearing a number of the purple-brown flowers, which hide themselves under the leaves, and fruit is forming in the place of the earlier blooms.

With regard to hyoscyamus the difficulties were greater. Professional growers could not supply plants. Seeds purchased would not germinate. At last, through the kindness of J. Montague, Esq., some from his garden produced young plants, but the slugs made short work of them; they evidently like the sedative principle of hyoscyamus as well as that of lettuce. Belladonna they will not touch. One plant survived its enemies and the winter's cold and wet, but this year it followed it predecessors' fate. Professor Bentley supplied a fresh quantity of seed, as also J. Baker, Esq., of Kew; both have germinated, and some of the Professor's seedlings are a foot high. Hyoscyamus flourishes best on a dry soil. Their value remains to be tested, as also whether the alkaloidal principle is increased or diminished by higher cultivation. I shall be glad to supply a few plants of hyoscyamus or fruit of belladonna to any country chemists who will report to this Association how the plants succeed.

A vote of thanks having been passed to the authors of these papers,

Mr. J. A. Bell said he had listened with great pleasure to Mr. Hasselby's paper, and having a larger garden than he well knew what to do with, he would put in as many plants as Mr. Hasselby would supply him with, and see that they were well looked after. In May or

June next year he should then probably be able to supply Mr. Gerrard with material to manipulate.

Mr. ATKINS remarked that the conditions of plant life, especially as varied by a state of wildness or cultivation, were as yet but very little understood, and further experiments ought to be made. There was a plant which grew in Wiltshire and which some years ago was of some importance there as an industry, wild valerian. It used to be exported to America in considerable quantities, but he understood it was now cultivated there. Wild plants by a process of natural selection found out the food required for the development of their active principles. In his own neighbourhood some plants would grow on one side of a hedge and not on the other, and often on the side where he should not have expected them to grow, where they got the afternoon sun, not the morning. Two or three years ago, when at Vevey, he was told by a large vine grower, that the grapes of one field which had the afternoon sun produced a wine of much higher quality than the vines which had the morning sun. All these things seemed to show than when plants were taken from a state of nature, the conditions of their growth required very careful study.

Mr. NAYLOR asked what indicator Mr. Gerrard employed in titrating liquid with sulphuric acid. He had had some experience in the matter and was not at all satisfied with anything he had used.

Mr. SCHACHT said the value of such a communication as Mr. Gerrard's consisted essentially in the accuracy of the results. He did not mean to impute to him any want of accuracy in his work, but as his process for estimating these alkaloids was not universally admitted to be the most accurate, he should like to know if he had systematically compared his results with those obtained by other processes.

Mr. GREENISH said it was very interesting to hear from Mr. Gerrard for the second time that he found more of the active principle of belladonna in the leaves than in the root. Some two or three years ago Mr. Gerrard had read a paper which strikingly confirmed some very accurate experiments made by Professor Dragendorff on the henbane, and it had always been a matter of surprise to him (Mr. Greenish) that the henbane should contain more of this active principle in the leaf while the belladonna contained more in the root. It seemed, however, from Mr. Gerrard's researches that they would have to return to the leaf again, for if the root were not the best, why use it for making any preparation in the Pharmacopœia? He apprehended the leaves could be obtained more readily, and in greater quantity than the root. He knew there was a difference in medicinal plants under cultivation, though it might be difficult to determine the exact amount of cultivation required to produce it. By continued garden cultivation the active principles were in some cases almost entirely eliminated. He did not consider merely taking a plant from its habitat and dropping it into a garden to be cultivation; it required some time for cultivation to produce its full effect.

Professor REDWOOD said that with regard to the question of using the root or leaf of a plant in cases where both were available, it was in his opinion desirable that experiments should be carried further than, so far as he was aware, had been done as to the relative permanence of the active constituents of these two parts of the plant. There was reason to believe that the leaf was more liable to undergo deterioration from keeping than the root, certain constituents, especially chlorophyll, being of a very changeable nature. This was a point of practical importance, because if the root retained its activity more permanently it would afford the means of making preparations at times of the year when the leaf would not be available. The discussion on the effects of cultivation upon plants had reminded him of a circumstance within his own experience. He had been trying to improve the growth of asparagus in his own garden without very good results, and his gardener, who was not very scientific but who had strong opinions of his own, said the bed required manuring, and especially that salt should be an ingredient. He was quite inclined to agree with him that salt should be used as a manurial agent, and finding he could buy salt much cheaper by the ton he ordered that quantity. The gardener applied it freely to the asparagus bed, with the result that while they had a bad crop before they got none afterwards, and on taking up the roots they were found to be quite dead. This only showed that cultivation might be carried too far, and that even fertilizers might be applied in too lavish a manner.

Mr. COOKE (Wandsworth) said in his experience there was very little difference in the permanency of the leaf or the root, if proper care were taken, but if the same kind of skill were applied to storing the leaves as Professor Redwood had devoted to the growth of asparagus they could not expect very satisfactory results. Very little more trouble and skill were required in securing the activity of the leaf than that of the root, but it certainly required more care. The leaves should be dried as rapidly as possible at the lowest possible temperature. The root would stand much rougher treatment, and that possibly would account for the difference in medicinal qualities which was often attributed to different parts of the plant. His experience was that the leaf when carefully dried, especially in the dark, gave better results than the root.

Mr. BOTTLE said he had been much impressed with Mr. Gerrard's remark as to finding more alkaloid in belladonna grown in his own garden in London than in that grown in the country. One could quite understand that difference of soil and atmosphere would produce a great difference in the development of plant life; but there was another element which had recently been shown to have great influence, viz., the electric light; he would like to know whether Mr. Gerrard's plants had been cultivated with this advantage.

Mr. WREN was not surprised that Mr. Hasselby had not succeeded in growing henbane from seed, as he believed all growers submitted the seeds to a process of kiln drying.

The PRESIDENT asked if that could be considered honest on the part of the dealers.

Mr. WREN said it would be as well not to answer that question, as the English growers were well known; but he believed the Germans made no secret of it.

Mr. HOLMES thought Mr. Gerrard had very clearly shown that the belladonna root could not be divided with profit. Lavender and several other plants were often propagated in that way with the result of ultimate failure, as the plants generally died of fungoid disease. The question whether root or leaf should be used in medicine was a very important one. Mr. Gerrard had shown that the leaf was as rich in alkaloid as the root, but he could not agree with him that the root should be used for liniment. As far as he could ascertain the root which chiefly came into the market was imported from Germany, and was very carelessly collected; indeed he had not been able to get a good specimen for some years past. Those who cultivated the root in this country chiefly used it themselves, or if any came into commerce it was probably that which came from plants that had yielded leaves for at least three years, and as there would be so much difficulty in getting good roots he should imagine it would be better to use well dried leaves. Mr. Hasselby's remarks were very interesting, though he believed the biennial plant did not grow a foot high the first year, but the leaves spread on the ground like a mangold wurzel or turnip, without a stem, while the annual rose up at once into a stem. He quite agreed with him that if the plant were properly cultivated with a view to develop certain qualities it would be preferable to the wild variety; but when plants were cultivated with a view to produce flowers and seeds, the circumstances would not always be such as would tend to develop

the alkaloids. He had only seen belladonna growing on a calcareous soil, either chalk or limestone, and therefore it was very likely that the addition of lime to the soil would be useful. There was no doubt that the morning or afternoon sun had a different influence on many plants, but he did not know whether it affected belladonna. He had found belladonna growing on the Kentish hills with a southern aspect, also in a wood with an eastern aspect, where it grew 4 or 5 feet high, and also with a western aspect to the average height; but in every case it was on a declivity, so that good drainage was probably essential to its successful growth. With regard to henbane, a friend in the north had promised him some seed when it was matured, and he would forward some to Mr. Bell. It was very difficult to get good henbane seed in commerce; many other seeds were often adulterated and dried by heat, and a purchaser could not be sure of what he got from a dealer. He found it was the practice in some cases to break up the henbane leaves into small pieces, which he thought objectionable, for though the specimens he had examined had been of excellent quality, it was not possible for an ordinary observer to distinguish them accurately in that form.

Mr. MARTINDALE said the belladonna root made a far cleaner liniment than the leaves, if of the same strength, the chlorophyll in the leaves making the preparation dirty, as belladonna plaster generally was. It was desirable on this account, and also for economy's sake, to employ both leaves and root. The plant might be used for a few years to produce leaves and then it might be dug up and the root used for liniment and the preparation of an alcoholic extract of the root. As mentioned by Mr. Barnard, some years ago, a preparation from which this could be made more easily and conveniently than by the present method would certainly be valuable, especially for suppositories. Any practical pharmacist who had to make suppositories containing two or three grains of the ordinary extract of belladonna knew the difficulty there was in making them presentable; the other preparation, being much more active, might be mixed with plenty of cacao butter, or whatever excipient were used, and made a better article than that given in the Pharmacopœia.

Mr. GERRARD, in reply, said he had been particularly interested in Mr. Hasselby's paper, and he should like to ask him if he were certain he could distinguish in the plants which grew in his garden annual from the biennial variety. Had they all an upright growth and tendency to flower or were some of them flat like cabbage plants?

Mr. HASSELBY said none had flowered; they were seedlings of three months' growth, about twelve inches high; there was no tendency to flower, the leaves all sprang from the root.

Mr. GERRARD said he was glad of this opportunity to say something about henbane, which he had paid a great deal of attention to for some two or three years. He had experienced the same difficulty in getting plants as had been mentioned, but had overcome it now through the kindness of a farmer in Warwickshire, who was this year cultivating three acres. They managed to get some wild henbane plants from which a few ounces of seed were obtained, and this was thrown about the corner of a field, the soil of which was very rough and where scarcely anything else would grow. The first year the plants came up most curiously. Amongst them they found a few cabbage-like plants, but the majority grew 2 or 3 feet in height, and branched off considerably. Then, again, they found the so-called annual variety, which was simply a flowering stalk 12 inches high. What were these varieties? One was a simple stalk a foot high, bearing a head of flowers; the other plant was 2 or 3 feet in height giving off large branches, and then, again, there was the so-called first year's biennial variety, which simply produced small cabbage-like plants. Last year a considerable quantity of seed was collected and about three acres were planted, and this year the result had been the same, or very nearly so. The supposed biennial flat plants had been left in the ground, and they were now growing up and were going to flower. There was evidently something here which needed explanation. There were either three varieties or one was a hybrid; but he hoped to be able to clear up the matter in another year. He could not agree that it was easy to distinguish between annual and biennial henbane as regards colour of petals. It was said that 90 per cent. of the flowers of the annual variety were yellow, whilst those of the biennial had a purple tinge. But his experience was almost the direct contrary; there were as many yellow flowers on the biennial variety as purple. Mr. Hasselby had put the question, what was a cultivated plant as distinguished from a wild one? He considered that a wild plant was a self-sown one, and was more hardy, having been self-sown for years and thriving in the particular locality. If you took seeds from such a plant and placed them under cultivation, the plant became altered in form, less hardy, and required more care and attention. There was a good example of that in the camomile, there being a great difference between the wild and cultivated kinds. What the influences were which produced the difference he would not pretend to say, for it was a very deep subject. He should be glad to accept Mr. Bell's offer to send him plants for examination, although he had now secured a fair supply. The only way to decide between the annual and biennial plant was to work out the difference in the percentage of alkaloids contained in them; but it would never pay anyone to grow the annual henbane while he could grow the biennial, it being so stunted, and having such a small weight of leaf. His experience agreed with Mr. Naylor's that it was very difficult to decide on a good indicator for the percentage of alkaloid; he had tried phenolphthalein, but had come to the conclusion that litmus was the best after all, and generally used that. Phenolphthalein had some advantages, but for a good all round indicator he preferred litmus. In reply to Mr. Schacht, he considered the process very fairly accurate. He used ether as the solvent which abstracted nothing from the belladonna but these alkaloids, which might be assumed to be either atropine or hyoscyamine; they both had the same molecular weight, and, therefore, had equal neutralizing power. The residues he got might either consist wholly of atropine or hyoscyamine, but it made no difference whether he measured them as one or the other. In his paper he stated them simply as alkaloids, and the acid he used neutralized nothing but those alkaloids. He considered the method therefore very fairly accurate, though not absolutely so. Professor Redwood had referred to a matter of considerable importance, viz., that the leaf might deteriorate more than the root by keeping, and his experience agreed with that statement, for unless very carefully prepared the leaf lost almost the whole of its activity in the course of one or two years. He had purchased belladonna leaf commercially, and could not say that it was of the good quality Mr. Holmes had described, for he had found it yield scarcely any atropine whatever. There was certainly an opening for pharmacists in the country to undertake the cultivation of these medicinal herbs. If they attended to the gathering of the leaves at the proper time and dried them rapidly, they would get a much better product than that usually sold.

The Conference then adjourned for luncheon.

Upon resuming, the first paper read was—

REPORT UPON AN INVESTIGATION ON THE CHEMISTRY, BOTANY AND PHARMACY OF THE STRYCHNOS NUX-VOMICA.

BY WYNDHAM R. DUNSTAN

AND F. W. SHORT.

In the present report it is intended to give in general

outline an account of an investigation with which we have been occupied during the past two years, and which has in part been endowed by a grant from the Research Fund of this Society. The investigation had for its objects: (1) The elaboration of a simple and accurate process for the extraction and estimation of the total alkaloidal constituents of the seeds of *Strychnos Nux-vomica*; (2) the discovery by analysis of authentic specimens whether the alkaloidal content of the different seeds was subject to much variation; (3) the quantitative separation of the alkaloids strychnine and brucine by a simple and accurate process; (4) the chemical and botanical analysis of the whole plant in order to see whether the alkaloidal content was in any way connected with distinct botanical characteristics; (5) a complete chemical examination of the galenical preparations of nux vomica that are found in commerce; (6) to devise processes for the production of standard galenical preparations whereby the therapeutic action of these preparations shall be rendered as far as possible definite.

The results of this inquiry have formed the subjects of ten papers which have been published in the *Pharmaceutical Journal*, nearly all of them having previously been communicated to the Pharmaceutical Society or to this Conference.

The investigation was commenced in the early part of the year 1882 and the first results were communicated in a paper read before the Pharmaceutical Society in February, 1883. In this paper (*Pharm. Journ.*, [3], xiii., 665) we described the results of a great number of experiments which were made in order to elaborate a simple process for estimating the amount of total alkaloid in the seeds. It was here shown that the whole of the alkaloidal constituents of the seeds could be most advantageously extracted by a boiling mixture of chloroform containing 25 per cent (by volume) of alcohol, and upon this fact a process was founded for the estimation of the total alkaloid, the latter being separated from the above solution by agitating with dilute acid. In the same paper it was shown by analysis that commercial specimens of the powdered seed varied to the extent of 1 per cent. in total alkaloidal content. In a second paper (*Pharm. Journ.*, [3], xiii., 1053) we described the results of a botanical and chemical examination of some authentic specimens of the different seeds that enter the British market under distinctive names. It was shown that those specimens differed in certain botanical characters from those described by many authorities. In analysing the seeds a process similar to the one just described was employed. Two distinct sets of specimens were analysed, the one collected in 1877, the other in 1883. The results showed (1) that nux vomica seeds contain much more alkaloid than is ordinarily supposed, the richest of the specimens yielding nearly 4 per cent.; (2) that the seeds which enter the British market stand in the following order of alkaloidal content: Bombay, Cochin, Madras. The results of the chemical and botanical analysis are incorporated in a tabular form in the original paper. The differences then observed might indicate the existence of a distinct species of the plant or might be exhibited by the same seed in different stages of development. This question we were unable to settle at this stage of the investigation, owing to there being no authentic specimens of the entire plant available in this country. Through the kindness of Dr. Ondaatje, of Galle, Ceylon, we were subsequently supplied with the necessary specimens, and while these were in course of preparation we commenced experiments upon the separation of the alkaloids, strychnine and brucine. In a paper read at a meeting of this Conference at Southport last year, we described a process for the quantitative separation of these alkaloids, which is dependent upon the difference in the solubility of the two ferrocyanides in dilute sulphuric acid. The process, although not at first ensuring an absolute separation, gives results that are perfect from an analytical point of view, and is the simplest and probably the most accurate process that has yet been proposed. Having got so far with the chemical investigation of the subject, we were in a position to examine the galenical preparations which are made from the seeds. With this object we applied to the Research Fund of the Conference for a grant to aid in the examination of the alkaloidal value of the galenical preparations of nux vomica then in commerce. In a paper read at the last meeting of this Conference (*Pharm. Journ.*, [3], xiv., 292) a process was described for estimating the alkaloids in the tincture of nux vomica. In the same paper the result of the analysis of the strychnine and brucine in twelve commercial specimens of tincture of nux vomica was given, which showed that not only was the quantity of total alkaloid subject to variation, some specimens containing twice as much as others, but the relative proportion of strychnine to brucine also seriously varied. In a subsequent communication to the Pharmaceutical Society (*Pharm. Journ.*, [3], xiv., 441), the causes of these variations were investigated, and it was then shown that in addition to the fundamental fact that the seeds of commerce vary in alkaloidal content, the strength of the spirit used makes a great difference in the quantity of alkaloid extracted. The results showed a mixture of 100 volumes of rectified spirit with 25 volumes of water to be the best solvent for extracting nux vomica. These results were confirmed by the appearance of a very careful paper by Mr. M. Conroy, who arrived at practically the same conclusion. In the paper just referred to, we also pointed out the fallacy of attempting to make a tincture of nux vomica of definite strength by determining the amount of total extractive matter it contains, such as is attempted in the Pharmacopœia of the United States. In addition it was shown that a stable tincture of nux vomica could not be prepared by dissolving the ordinary commercial extracts in alcohol. The commercial extracts of nux vomica were now examined, and in a paper read before the Pharmaceutical Society (*Pharm. Journ.*, [3], xiv., 443) a process was described for the estimation of the alkaloid in extract of nux vomica, which is similar in principle to that adopted in the analysis of the tincture of nux vomica. The analysis of twelve commercial specimens indicated a serious want of uniformity in the alkaloidal content.

Thus our report upon the commercial pharmaceutical preparations of nux vomica was decidedly unfavourable and showed that in all cases there was a lack of uniformity which was of grave importance from a medical point of view. For this reason a new series of experiments was commenced with the view of preparing pharmaceutical preparations of nux vomica that should be as far as possible constant in alkaloidal strength. In a communication to the Pharmaceutical Society, we have proposed a method for preparing a standard extract of nux vomica, that is an extract that shall contain a constant quantity of total alkaloid. Total alkaloid was after much consideration taken as the standard of constancy rather than strychnine alone for reasons that have been discussed by one of us elsewhere (*Pharm. Journ.*, [3], xiv., 875). The method proposed for the preparation of a standard extract of nux vomica consisted in first preparing by maceration and percolation with spirit of a definite strength a strong tincture of nux vomica, to estimate the amount of total alkaloid in this tincture and then to evaporate a given volume of it until it had a definite weight. Fifteen per cent. was taken as the standard of total alkaloid. The reasons for adopting this particular strength are fully discussed in the paper, not the least important being that this represents the strength of an average commercial extract of nux vomica and is consequently the strength which is relied upon in medicine. Then again it has been found from numerous experiments that working with a good commercial specimen of nux vomica it is always feasible to prepare a standard extract of this strength which pos-

sesses the ordinary physical characters of an extract, while this would not be the case if other standards were adopted. In another communication to the Pharmaceutical Society (*Phar. Journ.*, [3], xiv., 622) a method was proposed for preparing a standard tincture of nux vomica, that is a tincture which contains a constant quantity of total alkaloid. The exact standard of constancy was again in this case deduced from the analyses of tinctures which are at present used in medicine, an average specimen of which contains about 0·24 per cent. of total alkaloid. This percentage, which is equal to one grain of total alkaloid in one ounce of tincture was therefore adopted. It was shown that the preparation of the standard tincture could be accomplished in two ways—(1), by the dilution of the assayed percolate alluded to before, to a definite degree with spirit ; or, (2), by the solution of a definite quantity of the standard extract in a certain volume of spirit, the latter being of the same strength that was originally used in making the extract. In either case a perfectly stable tincture results. This paper concluded the report upon the pharmaceutical preparations of nux vomica for which a grant from the Research Fund of this Conference had been made, or rather the report covered more ground than that for which the grant had been made, namely, an examination of the commercial preparations of nux vomica. From a pharmaceutical point of view, this part of the subject had now been fully worked out.

The specimens of the nux vomica plant had now arrived from Ceylon, and we therefore commenced a complete chemical and botanical examination of them. In a paper communicated to the *Pharmaceutical Journal* ([3], xiv., 1025), we have described the principal reactions and properties of a new glucoside that we had isolated in large quantity from the pulp of the fruit and in small quantity from the seeds of *Strychnos Nux-vomica*. The glucoside we have called "loganin," and we propose at a future time to minutely investigate its chemical constitution.

The last paper (*Pharm. Journ.*, [3], xv., 1) contained the results of a very laborious and detailed investigation of the chemistry and botany of the *Strychnos Nux-vomica* indigenous to Ceylon, specimens of which had been collected by Dr. Ondaatje. The more important results reached may be thus summarized. The poisonous nature of the pulp which contains the seeds within the fruit was experimentally demonstrated by physiological experiment, and subsequently confirmed by chemical analysis which showed the presence of 1·4 per cent. of strychnine, and 1 per cent. of brucine. In addition to these alkaloids, the glucoside loganin exists to the extent of nearly 5 per cent. The results of the investigation showed that there was no evidence of the existence of a different species of the plant, but that the variation in the alkaloidal content of the seeds was fully accounted for by difference of development. The results obtained allowed us to formulate the facts in the following general statement or law. The alkaloidal content of the seeds is directly as their size and inversely as their number in the fruit. The seeds of the *Strychnos Nux-vomica* indigenous to Ceylon are particularly remarkable for their high alkaloidal content. One specimen of the seeds contained 5·34 per cent. of total alkaloid, a quantity far in excess of that which is usually supposed to exist in the seed of this plant.

The paper was illustrated by drawings from the living plant which were taken by Dr. Ondaatje, and contained tables exhibiting the results of the chemical and botanical analyses of the seed.

The PRESIDENT moved a vote of thanks to the authors, whose absence he regretted, and suggested that as the paper dealt to some extent with the question of standard strengths, though that was not the only one involved, any discussion upon it might be taken in connection with the subsequent papers by Mr. Schacht and Mr. Dott.

The next paper read was entitled—

NOTES ON THE ESTIMATION OF HYDROCYANIC ACID AND CYANIDES.

BY LOUIS SIEBOLD.

I have on a previous occasion called attention to the serious errors to which Liebig's process for the volumetric estimation of hydrocyanic acid is liable if the titration be conducted in the presence of less alkali than is requisite for the complete conversion of the acid into sodium cyanide ('Year-Book of Pharmacy, 1874, 568). The failure of litmus to indicate the point of neutralization, and the advice given in standard text-books to avoid an undue excess of soda, were mentioned in that paper as causes but too likely to lead to the serious error alluded to, especially as this failure of litmus as an indicator and the injurious results of the use of an insufficient amount of alkali had never been pointed out either by the author of the method or by standard works on analysis. Since that time various suggestions have been made for guarding against this source of error. Dr. A. Senier recommended that a small proportion of soda should be used at the beginning of the titration, just enough to react with litmus, and that further additions of alkali should be made as soon as it was found that the continued action of the silver nitrate solution caused this alkaline reaction to cease, taking care in this way that the mixture was still alkaline at the end of the process. He thus made sure of the use of a sufficient proportion of soda and guarded at the same time against a slight error known to be caused by the application of a large excess of alkali ('Year-Book of Pharmacy,' 1878, 520). When these suggestions were communicated to the Dublin meeting of this Conference, I expressed a doubt as to the expediency of this plan, on the ground that during the greater part of the titration the mixture would contain hydrocyanic acid in the free state, and that the loss of a small portion by volatilization would thus be difficult to avoid. Since that time I have had many opportunities of satisfying myself that these apprehensions were well founded, and that the accuracy of the process under these conditions depends on the rate of speed at which the titration is performed, The loss of HCy thus suffered may vary according to temperature and speed of working from mere traces up to as much as 10 per cent. of the actual proportion present.

More recently Mr. P. MacEwan has suggested the use of phenol-phthalein in the place of litmus ; but since sodium cyanide is not without action on this substance, even in the presence of free hydrocyanic acid, this plan is open to the same objections as the one just referred to. The crimson colour of the mixture, moreover, renders the precise recognition of the end of the titration with silver nitrate somewhat more difficult. What then is the best mode of working this test? In dealing with this question I wish to remind the meeting, in the first instance, that an excess of alkali, unless quite unreasonably large, does but affect the result to a very slight extent, and, therefore, does not impair the test for ordinary pharmaceutical purposes. If, however, absolute accuracy be desired, let me recommend the use of standard soda solution in the place of one of unknown strength and the performance of a preliminary titration in the presence of a very decided excess of alkali, having for its object an approximate estimation of the hydrocyanic acid present and consequently of the quantity of soda solution required. The second titration may then be carried out with the full knowledge of the amount of soda required, and by exceeding this proportion very slightly, so as to ensure slight alkalinity lasting to the end of the titration, highly accurate results are obtained. This is especially the case if the measured quantity of soda be introdnced into the beaker first and the acid allowed to flow to it from a burette, so as to prevent even the slightest loss by volatilization. I know of no other process of analysis superior to this in accuracy, if this mode of working be adopted.

At last year's meeting of the Conference I referred to

the process of the United States Pharmacopœia for estimoting the strength of hydrocyanic acid, in which an excess of calcined magnesia is used instead of soda, and the addition of the decinormal silver solution continued until the whole of the cyanogen is precipitated as silver cyanide, the end of the reaction being indicated by means of potassium chromate. The favourable opinion I then expressed regarding the accuracy of this method I have since confirmed by further estimations; but I must add that it is hardly equal in this respect to Liebig's process, worked in accordance with my suggestions, and has the disadvantage of being impaired by the presence of hydrochloric acid or chlorides. Speed of working, in this case, is an absolute condition to absolute accuracy, since the action of hydrocyanic acid on magnesia is incomplete and remains so until one-half of the total silver solution required for the proces has been added, and hence there is liability to loss by volatilization. To prevent this it is best to place the magnesia in a beaker, along with the potassium chromate, then to add the hydrocyanic acid from a pipette, and now rapidly to run in the silver solution from the burette, until the red coloration produced on the surface begins to disappear less quickly on stirring, after which the remainder of the silver solution may be added drop by drop until the reaction is completed. Worked in this manner the method gives excellent results, especially as the volume of silver solution required is double that of the one consumed in Liebig's process.

I have now to report that if the precautions just described be duly observed, the carbonates of magnesium, calcium, and barium, can be substituted in this process for the magnesium oxide, though in the case of barium carbonate a much larger proportion is needed than in the other cases. What I just stated respecting the action of the various carbonates of the alkaline earths holds true of the substances not only obtained by precipitation, but also of the corresponding native minerals, such as chalk, calc-spar, magnesite, etc. I do not recommend these substances to be used in the place of calcined magnesia, but merely wish to record, as an interesting chemical fact, the observation that a body of such extremely weak acid properties as hydrocyanic acid, which by itself is without action on these minerals, can be made to decompose them completely, and even without heat, by the intervention of silver nitrate.

Further experiments respecting the double cyanides formed in these titrations are still in progress.

The PRESIDENT, in proposing a vote of thanks to Mr. Siebold, remarked that this paper was in continuation of one read last year on the American process, which the author then seemed to prefer to Liebig's, but he now seemed to have somewhat modified that view. Of course Liebig's process required certain precautions, but the differences which occurred with careless manipulation were overcome by Mr. Siebold effectually. This process of using double titration, he was sure would give results of the greatest possible accuracy.

Mr. NAYLOR asked what was the real objection to the mercuric chloride test. His experience was that it was very accurate.

Mr. SIEBOLD agreed with Mr. Naylor that that process was very accurate; it had proved so in his hands at any rate, though in one well-known book, it was condemned. He did not exactly know how Mr. Allen, the author of that book, arrived at this conclusion. At the time the book was published, he had some conversation with him about it; at that time he (Mr. Siebold) had had but very little experience with the test, but since then he had repeatedly tried it, and had convinced himself it was very readily applicable and accurate, though he could not see that it was superior to Liebig's process. Possibly the reason Mr. Allen did not approve of it was that he had not got very accurate results by Liebig's process for comparison, that process being liable under certain conditions to give inaccurate results.

Parliamentary and Law Proceedings.

THE SALE OF PAREGORIC ELIXIR DEVOID OF OPIUM.

George Avill, grocer, Wickersley, was summond under the Food and Drugs Act with selling paregoric elixir, to the prejudice of the purchaser, Superintendent Hammond, on July 11th. The solicitor for the defence argued that the terms paregoric and paregoric elixir were not synonymous, that the certificate referred to paregoric only, which his client could not sell, as it contained opium. Opium was the principal ingredient in paregoric, and this elixir was kept as a substitute for it.—The fine was 1*s.* and costs.

Review.

A DICTIONARY OF DOMESTIC MEDICINE AND HOUSEHOLD SURGERY. By SPENCER THOMPSON, M.D., L.R.C.S. (Edin.). Revised by J. C. Steele, M.D., assisted by the Author. With a Chapter on the Management of the Sick Room. Seventeenth Edition. London: Chas. Griffin and Co.

The fact that this Dictionary has reached its seventeenth edition in a period of thirty years seems to indicate that it supplies a public need. The compilation of a popular work on medicine and surgery is an exceptionally difficult matter, since it is almost impossible to keep the "boundary line" between domestic and professional medicine. Such a work may even be dangerous in inducing the public to attempt the treatment of serious cases of disease. With regard to this the author, in his prefatory address, says "I know well what is said by a few about injuring the medical profession by making the public their own doctors. Nothing will be so likely to make 'long cases' as for the public to attempt any such folly; but people of moderate means—who as far as medical attendance is concerned are worse off than the pauper—will not call in and fee their medical adviser for every slight matter, and in the absence of a little knowledge *will* have recourse to the prescribing druggist, or to the patent quackery which flourishes upon ignorance, and upon the mystery with which some would invest their calling."

We are bound to say that the editor has kept the so-called "boundary-line" well, and we notice that after all descriptions of serious diseases the reader is advised in such cases to seek at once proper medical aid; but after all, the great difficulty which presents itself to anyone without medical training, in case of illness, is the diagnosis between a simple ailment and a serious disease.

Does this work afford means of distinguishing between the two? We think not, nor in our opinion can any book in the dictionary form do so.

In spite of this drawback the volume before us may be useful in case of accident or sudden emergency, such as in a case of scalding, burning, etc. It also, perhaps better than any other similar work, is likely to meet "the needs of colonists and emigrants from the mother country, of missionaries and the clergy in remote districts, and of many others whose lot is cast far away from professional assistance."

The scope of the dictionary is very comprehensive. In addition to the descriptions of disease and its treatment it gives under their respective headings some account of the anatomy of the various parts of the body, and describes in some detail the minute structure of the different organs and the physiology of certain natural processes, such as digestion, respiration, etc. It also gives directions as to the proper methods of procedure in cases of accident involving fractures, injuries to joints, hæmorrhage, etc.

To indicate the great variety of subjects treated we mention the following as being described at considerable length:—

Bandaging, health resorts, the management of childbirth, the general treatment and management of children, the sites and proper construction of hospitals, vaccination, the ambulance, food, and the general principles of hygiene and sanitation under the headings Climate, Air, Public Health, Drainage, Ventilation, Disinfectants and the like.

Descriptions of some few instruments, of drugs, and of a few poisonous indigenous plants are scattered throughout the book, and the whole concludes with a really admirable article on the management of the sick room, by Dr. Anderson, and a glossary of scientific and medical terms not included under alphabetical headings in the dictionary.

Upwards of two hundred and fifty woodcuts and diagrams are to be found, but they are of very unequal merit. Some are very good, while others, such as those supposed to represent the belladonna plant and calumba root, on pp. 63 and 90 respectively, might be omitted with advantage.

The treatment of the various subjects throughout the book is generally good. The descriptions are clear, accurate and concise, but sufficient for the purpose of a popular work. Technicalities are as much as possible avoided throughout, and absolute errors are remarkably few.

As regards its medical and surgical value the book is calcnlated to be useful to all persons who may be in such remote places as to be unable to call in medical aid when required, and we can recommend it as being at least as good as anything of the kind which has appeared. To others it affords in a handy form a mass of information upon a variety of subjects, concerning which the public is now exhibiting considerable curiosity.

Obituary.

Notice has been received of the death of the following:—

On the 8th of June, Mr. Thomas Edwards, Chemist and Druggist, Usk, Mon. Aged 36 years.

On the 15th of June, Mr. William Halley, Chemist and Druggist, Leith, N.B. Aged 63.

On the 25th of June, Mr. John Francis, Pharmaceutical Chemist, Wrexham. Aged 47 years. Mr. Francis had been a Member of the Pharmaceutical Society since 1865.

On the 26th of June, Mr. Arthur Binstead, Chemist and Druggist, Ebury Street, Pimlico, London. Aged 52 years.

On the 5th of July, Mr. James Fingland, Pharmaceutical Chemist, Wavertree. Mr. Fingland had been a Member of the Pharmaceutical Society since 1853.

On the 11th of July, Mr. Walter Fielder, Chemist and Druggist, Landport. Aged 49 years.

On the 12th of July, Mr. William Johnstone Nisbet, Chemist and Druggist, Edinburgh. Aged 70 years.

On the 14th of July, Mr. John Walker, Chemist and Druggist, 168, Westgate, Bradford, Yorks. Aged 56 years.

On the 18th of July, Mr. George Buckland, Chemist and Druggist, Salisbury. Aged 87 years.

On the 19th of July, Mr. Robert Dowty, Chemist and Druggist, West Allington, Bridport. Aged 63 years.

On the 19th of July, Mr. Edward Power, Pharmaceutical Chemist, Walton-on-Thames. Aged 54 years. Mr. Power had been a Member of the Pharmaceutical Society since 1852.

On the 9th of August, Mr. Henry Kenrick, Chemist and Druggist, Yalding, Kent. Aged 74 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily or publication, but as a guarantee of good faith.*

The Popular Use of Henbane Seeds.

Sir,—The use of henbane seeds employed somewhat in the manner described by Mr. Prebble illustrates a popular delusion, for apart from the therapeutical effects of the steam from the water, and the counter irritation to the eyes, nose, and throat, inasmuch as a cloth is generally thrown over the head, the hot water, and the shovel with live coals over which the seeds are sprinkled, there is a magical appearance of maggots, which are eagerly sought for and found in the water which has caught the saliva from the open mouth held over it; the cause of the toothache is therefore removed, there is no longer the painful gnawing, a physical and psychical cure has been effected.

I have often thought when practically demonstrating the "worms" with their dark extremnities to be the uncoiled embryos set free by the heat, that I am cruelly breaking a useful charm. W. Smart.

Erratum.—In our *résumé* of the proceedings at the Conference last week the paper on "The Estimation of the Alkaloids in *Atropa Belladonna*" was erroneously attributed to Messrs. Dunstan and Short instead of to Messrs. Dunstan and Ransom.

C. H. Clarke.—The exact quantity ordered should be sent.

Dispenser.—We do not quite understand your question, but of course much would depend upon the condition of the liquor calcis.

Chemist.—Should the prescriber not be a qualified practitioner it would not be advisable to dispense the prescription; but such a mixture would not require to be labelled "poison," as the prescription would be copied in the prescription book.

J. N. C.—We think the amount of penalty in the case referred to is of secondary consideration; the important fact is that a conviction was obtained.

S. S.—Ext. Aloes Soc.

Sindall.—The name "capillaire" was originally given to a mucilaginous syrup, prepared by adding to an infusion of maidenhair some sugar and orange-flower water. Clarified syrup, flavoured with orange-flower water, is now generally supplied for "capillaire," and put up in bottles known to the trade as "capillaires." The colour is that of simple syrup.

L. Watson.—Parrish's formula for chemical food has been already printed in full in this series of the Journal (vol. i., 857), and is too long to reproduce here. The preparation has also formed the subject of a large number of papers that have been published. See especially Mr. Howie's communication on "The Phosphate Syrups" (*Pharm. Journ.*, [3], vi., 804).

F. R. Bessant.—We are not quite sure, but presume that the mixture referred to is the same as is printed in vol. viii., p. 100, of the present series of this Journal.

A. W. Forster.—The 'Extra Pharmacopœia' gives the dose of phosphide of zinc as one-twentieth to one-third of a grain.

J. H. Aldridge.—Pharm. Journ., [3], vol. xi., p. 718, February 26, 1881.

A. N. S.—(1) *Sedum album.* (2) *Sclerochloa procumbens.* (3) *Scirpus maritimus.*

J. R. D. B.—(1) *Dactylis glomerata.* (2) *Carex glauca.* (3) *Serrafalcus mollis.* (4) *Poa pratensis.* (5) *Cynosurus cristatus.* (6) *Alopecurus pratensis.*

J. Hutchinson.—(1) *Agrostis alba.* (2) *Juncus lamprocarpus.* (3) *Juncus supinus.* (4) *Juncus effusus.* (5) *Juncus glaucus.* (6) *Molinia cœrulea.*

E. Bracher.—Trifolium procumbens.

W. H. G.—It is not possible to say from the leaf alone, especially as there is no evidence to show whether stipules are present or not, or the arrangement of the leaves or the stem.

Communications, Letters, etc., have been received from Messrs. Legg, Mason, Lloyd, Farnworth, Borland, Dott, Stanford, Willmott, Thresh, Alcock.

SYDNEY, NEW SOUTH WALES,

JUNE 11, 1884.

ENO'S FRUIT SALT IN EQUITY.

Before his Honor the PRIMARY JUDGE.

ENO *v.* DAVIES AND ANOTHER.

Mr. J. E. Solomon, Q.C., and Dr. Donovan, instructed by Mr. De Lissa, for the plaintiff; Mr. Owen, Q.C., and Mr. Nash, instructed by Messrs. Bull and Bull, for the defendants.

This is a suit instituted by James Crossley Eno, of Pomeroy Street, Hatcham, Surrey, England, to have the defendants, William Davies and James Channon, trading as William Davies and Co., Goulburn, and Harbour Street, Sydney, ordered to take a certificate of registration for a trade mark called "The Australian Fruit Salt" off the file at the Registrar General's office, and also to have them restrained by perpetual injunction from using the title to any other commodity. The plaintiff claimed that the trade mark was an infringement of his own, viz., Eno's Fruit Salt, Fruit Saline, and Fruit Powder. Consequential damages were also claimed. The defendant's mark was registered in this Colony two months before plaintiff's.

His Honour, in giving judgment, said he had no doubt that the case came within the principle laid down in the cases which had been cited wherein the Court enjoined a defendant not to continue the use of his trade mark. Although there were some important points of distinction in the goods, still there were points of resemblance which were calculated to induce persons to believe that they were obtaining the plaintiff's, when in reality they were buying the defendant's. The bottles were about the same weight and shape, and a purchaser of the defendant's would hardly know he had not got Eno's until he opened the package. Looking at the two bottles, he thought purchasers were exceedingly likely to be misled, because a man was not supposed to carry his last bottle with him in order to see that he was getting the same article, and persons buying were not supposed to be always suspicious that frauds were being practised upon them. He considered the term "fruit salt" sufficiently distinctive to be in itself a trade mark, and it had been proved in evidence that people generally asked for it by that name. The resemblance in the bottles and in the printing on the wrappers was so close that he regretted he could not say that it resulted from accident or was consistent with innocence. The distinctions seemed to have been carefully studied in order to escape, if possible, the results of imitation. The defendants had brought out their article just when the plaintiff's had taken a gigantic jump in public estimation, and had acted in such a way as to induce him to believe that they intended to lead the public to think they were buying plaintiff's goods when they were served with theirs. There was fraud which tradespeople unfortunately did not think much of, but which the Court always regarded with the greatest reprehension. He did not think the argument as to the second section of the Act had very much to do with the case. When the defendant registered he must have obviously known that Eno's Fruit Salt was in the market. He had no more right to register than he had to sell. He did not think the Act in any way interfered with the powers which the Court of Equity possessed before it became law. The Act had only been passed to afford a speedier and readier remedy to those who registered under it. The seventh section evidently contemplated that such a suit as the present one should be taken by a person who considered he had been wronged, as the plaintiff had been. He would grant the injunction in the terms of the prayer, restraining the defendants from using the trade mark, on the ground that it was an infringement on the plaintiff's prior and exclusive claim. He would order them to take such proper and necessary steps as were possible to take the certificate of registration off the file, but if a power greater than theirs stood in the way in the matter, they would be relieved from attachment. He did not see how he could compel the Registrar-General, who was an officer appointed by Parliament, to do a certain thing, to cancel the certificate, especially as he had not been made a party to the suit. The certificate, however, could be delivered up, because it was part of the subject matter of the suit. He would order the defendants to pay costs up to the hearing, and would direct an issue as to consequential damages to be tried before a special jury of four in the Jury Court on a day to be named. He would make the question of costs of these further proceedings dependent upon the result, because it might be that he would not give plaintiff his costs if he did not recover a substantial amount.

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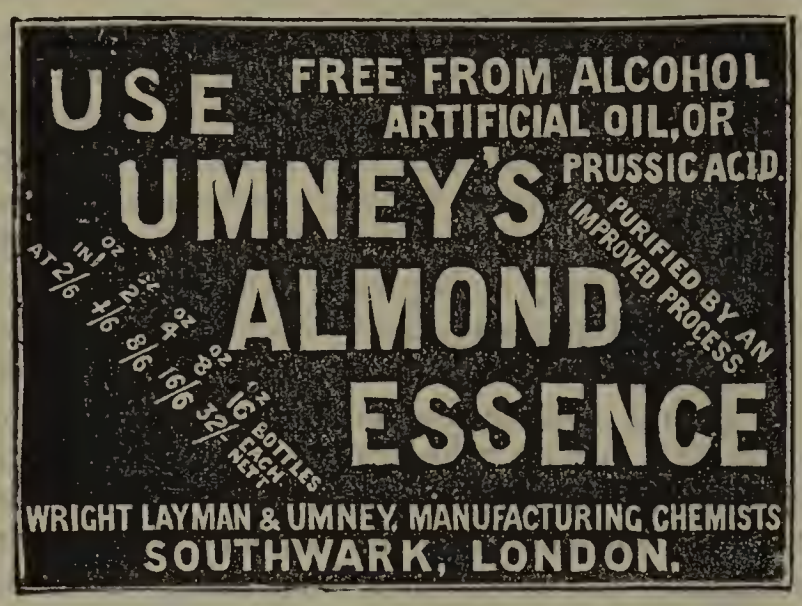

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Perfectly reliable, and the most valuable fluid form for the administration of *Pepsin. Porci.* It is of definite strength and slightly acid; free from odour, and almost tasteless.

7/ per lb., C. Qts. 6/6, W. Qts. 6/.

T. GREENISH, { 20, New Street, Dorset Square, and 5, Bathurst Street, Hyde Park, W.

THE PERFECT SURGICAL BANDAGE

Preferred to all Makes hitherto used.

In Cases of Twelve Six Yard Rolls, 2 inches wide, 3s. 9d.; 2½ inch, 4s. 6d.; 3 inch, 5s. 6d.; or, case containing twelve six yard rolls of each width, 13s.

Free by post, to any address in the United Kingdom, for prepaid orders only. Manufactured by

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EQUAL TO AND CHEAPER THAN VASELINE.

SANITARY FLUID AND SHEEP DIP,

THE CHEAPEST AND BEST DISINFECTANT.

Grease, Pitch, Asphalte, and all products of Tar and Rosin.

Samples and Prices on application.

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BRADLEY & BOURDAS'S

Albatum or White Rouge, for Cleaning Gold, Silver and Plated Goods.

Since its introduction as a substitute for the ordinary Rouge, a quarter of a century ago, the sale has amazingly increased both at home and abroad. A trial is only needed to prove its superiority over other Plate Powders in use. Sold in Boxes at 1s. and 2s.; Tins, 6s.

6, PONT STREET, BELGRAVE SQUARE, and 48, BELGRAVE ROAD, S.W. } **LONDON**

REGISTERED.

PURE AËRATED WATERS

Ellis's Ruthin Waters.

CRYSTAL SPRINGS

Soda, Potass, Seltzer, Lemonade, Lithia, and for GOUT, Lithia and Potass.

CORKS BRANDED "R. ELLIS & SON, RUTHIN," and every label bears their trade mark. Sold everywhere, and Wholesale of R. Ellis & Son, Ruthin, North Wales. London Agents: W. Best & Sons. Henrietta St., Cavendish Sq.

ROSE'S LIME JUICE CORDIAL

The Favourite Summer Beverage; wholesome and refreshing. A Delicious Cooling Drink—Effectually Quenching Thirst.

ROSE's LIME JUICE CORDIAL.
Prepared from the Lime Fruit. Is entirely Free of Alcohol. A Wholesome Family Beverage for Dinner or Supper Table.

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A Delicious Drink in Water—Effervescing in all Aerated Waters. An excellent Stimulant blended with Spirits.

ROSE's LIME JUICE CORDIAL.
The Perfection of Fruit Beverages. Delicious, Cooling and Refreshing in Water—Effervescing in all the Mineral Waters

ROSE's LIME JUICE CORDIAL.
The Favourite Beverage for Lunch, Dinner or Supper Parties. Eminently Wholesome. No table should be without it.

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A Real Summer Delicacy. Cooling and Refreshing in Water. Effervescing in all Aerated Waters. Effectually Quenching Thirst.

ROSE's LIME JUICE CORDIAL.
The favourite Temperance Beverage; Delicious, Cooling and Refreshing. Entirely Free of Alcohol. Eminently Wholesome.

ROSE's LIME JUICE CORDIAL.
An excellent Substitute for the Lemon as a flavouring in Summer Drinks, Claret Cups, &c. Cooling and Refreshing.

ROSE's LIME JUICE CORDIAL.
Is highly Medicinal, Cooling and Purifying the Blood. An excellent Stomachic, Assisting Digestion.

ROSE's LIME JUICE CORDIAL.
No Beverage has received higher recommendations from the Medical Profession as eminently wholesome.—See *Lancet*.

ROSE's LIME JUICE CORDIAL.
The Family Dinner Table has additional attractions when supplied with Rose's Lime Juice Cordial in water.

ROSE's LIME JUICE CORDIAL.
Non-Alcoholic. It has now become the favourite Beverage all the year round.

ROSE's LIME JUICE CORDIAL.
Sold everywhere. As a protection against imitations, Purchasers should order "Rose's Lime Juice Cordial."

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It has been decided in various Chancery Suits that Rose & Co., London, are the original introducers of Lime Juice Cordial.

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Exported to all parts of the World. Special Export Terms. Wholesale Stores, 11, Curtain Road, London; and at 41, Mitchell Street, Leith.

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ARNICATED

WHITE FELT

CORN AND BUNION PLASTERS,

INVENTED AND ESTABLISHED BY

HENRY YOUNG,

A.D. 1846,

AND FAVOURABLY KNOWN ALL OVER THE GLOBE.

SUPPLIED BY ALL WHOLESALE HOUSES.

N.B.—Please see that YOUNG'S Goods are supplied, as there are many worthless imitations.

Manufactory, 72, Clerkenwell Rd. London, E.C.
(LATE OF CARTHUSIAN STREET.)

Chemists' Tea Agency.

WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S
INTERMEDIATE TEA, 2s. per lb.
BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

FRED^K FINK & CO.

10 & 11, MINCING LANE, LONDON, E.C.

SPECIALITIES: Glycerine—Gum Arabic—Gum Tragacanth—Pure Beeswax—Gelatine—Glucose

£200 REWARD.

THE undersigned, the Proprietors of **Liebig's Chemical Food or Wine of Phosphates**, having reason to believe there is a spurious article on the market, hereby offer a reward of **Two Hundred Pounds to any person** or persons who shall give such information as will lead to the discovery and conviction of anyone making or offering for sale, spurious or forged imitations of their proprietary article. No travellers are employed, and Goods are never given in payment of accounts, consequently no **Liebig's Chemical Food or Wine of Phosphates** can be genuine unless it is obtained in the usual way of business from the wholesale houses. If desired, all communications will be treated as strictly private and confidential. LIEBIG & Co., Proprietors of Liebig's Chemical Food or Wine of Phosphates, 12, York Buildings, Adelphi, London, W.C.

S. SAINSBURY'S

MANUFACTORY—
176 & 177,
STRAND, LONDON.

Lavender Water.

In Bottles, from 1/ to 6/; in Cases, from 3/ to 15/6.
TRADE TERMS ON APPLICATION.

TASTELESS PILLS
(COX'S PATENT.)
Dated and Sealed April 13, 1854.
Chemists selling TASTELESS PILLS *have an advantage over others neglecting to do so.*

We strongly recommend our Aperient Pills at 6s. and Compound Rhubarb at 7s. per pound, coated, as saleable Pills. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. in the Shilling will be allowed if Stamps or P.O.O. are remitted with order.

Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

The Registrar of Trade Marks (after giving the usual public notice prescribed by Parliament to allow of opposition) has granted us the above "Trade Mark," thus officially recognising us as the "ORIGINAL MAKERS OF TASTELESS PILLS," and no pills will be sent out without this mark on all bottles or packages.

Any Formulæ Dispensed, Covered, and Estimates given.

Samples, with a list of pills from upwards of 500 different forms which are kept in stock, will be forwarded free on application.
ARTHUR H. COX & CO. *Tasteless Pill Manufacturers,* **Brighton.**

MEMORY AND SUCCESS

WHAT IS IT THAT contributes greatly to success?
A good memory.
WHAT IS IT THAT always causes failure in life?
A bad memory.
WHAT IS IT THAT is indispensable to every Lady and Gentleman, Student, Chemist, Physician, Surgeon, &c.?
A good memory.
WHAT IS IT THAT every one can obtain from PROFESSOR LOISETTE? A good memory—the Physiological Art of Never Forgetting—wholly unlike Mnemonics. Any book whatever mastered in one reading.

Prospectuses post free, giving opinions of Mr. RICHARD A. PROCTOR, Dr. ANDREW WILSON, and others who have studied the system.

Great inducements to Correspondence Classes in "Never-forgetting" and for Cure of "Mind-Wandering" in all parts of the world.
Professor LOISETTE, 37, NEW OXFORD STREET, LONDON.

St. Thomas's Hospital Medical School,
ALBERT EMBANKMENT, LONDON, S.E.

The WINTER SESSION of 1884-5 will commence on OCTOBER 1st, when an Introductory Address will be delivered by Sir J. Risdon Bennett, M.D., F.R.S., at 3 p.m.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

West London Hospital Preparatory

SCHOOL OF MEDICINE.

The FIRST SESSION will commence in October next.

The objects aimed at in this School may be shortly stated as follows:—

1. To give in a more complete and systematic manner than has heretofore ever been attempted, all the advantages of a year's pupilage at a first-class provincial infirmary or county hospital.
2. To give instruction in Natural Science.
3. To give commencing Medical Students an early insight into Medical work, so that they may, without needless loss of time or money, be able to judge whether or not they have chosen the right profession.

Students will receive thorough and practical tuition in Osteology, Chemistry, Physics, Materia Medica, Pharmacy, Botany, and Elementary Physiology.

The Hospital contains 101 beds. 1200 in-patients and 14,000 out-patients are received annually.

FEES, payable in advance:—For the Complete Course, including one year's Hospital Practice, 25 guineas. For an extra six months, 7 guineas. For one Winter Session, 18 guineas. For one Summer Session, 12 guineas. Separate Courses of Lectures may be attended for 3 guineas each Course.

Prospectuses, &c., may be obtained from the Secretary of the School, West London Hospital, Hammersmith, W.; or from Mr. C. B. Keetley, 20, Princes Street, Hanover Square, W.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

FOURTEENTH SESSION, 1883-4.

Entries now begun for the term commencing Sept. next.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

THE UNIVERSAL Postal System of Instruction

Has been established for the express purpose of preparing for the various examinations of the Pharmaceutical Society students residing in the country, or those unable to attend a School of Pharmacy.

Pharmaceutical Preliminary	**Fee**	**10s. 6d.**
Pharmaceutical Minor	**Fee £1**	**1s. 0d.**
Pharmaceutical Major	**Fee £1**	**1s. 0d.**
Medical Preliminary	**Fee £1**	**1s. 0d.**

TESTIMONIAL.

BUCKLEY HOUSE, LLANDUDNO,
March 10th, 1884.

GENTLEMEN,

Your excellent system of College training and valuable Postal Lectures have gained a well deserved repute, yet I gladly testify to the entire satisfaction I have felt in going through both one and the other.

Your course of teaching is so thorough, and your efforts to assist and wisely direct every student so unremitting, as to call for the highest praise.

I am, Gentlemen,
Yours very truly,
M. A. S.

The original of this and numerous other Testimonials may be seen at the Office.

For full particulars apply to Messrs. WILLS & WOOTTON, Trinity Square, London, S.E.

The London Hospital and Medical

COLLEGE, Mile End, E.—The SESSION 1884-5 will commence on Wednesday, October 1st, 1884, when the Prizes for the past Session and the Nursing Probationers' Prizes will be distributed at 8 p.m., by the Right Hon. the Lord Mayor, M.P., accompanied by the Lady Mayoress. There will be a Conversazione, to which all past and present students are invited. FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30 and £20, will be offered for competition at the end of September to new students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All Resident and other Hospital appointments are free, and the holders of all the Resident appointments are provided with rooms and board entirely free of expense. The Resident appointments consist of Five House-Physiciancies, Five House-Surgeoncies, and One Accoucheurship; Two Dressers and Two Maternity Pupils also reside in the Hospital. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, District, East London, and South Eastern Railways have stations within a minute's walk of the Hospital and College.

For prospectus and particulars apply personally or by letter to Mile End, E. MUNRO SCOTT, Warden.

OWENS COLLEGE, MANCHESTER.

Prospectuses of the Pharmaceutical Courses in the Session 1884-5 will be forwarded on application.

J. HOLME NICHOLSON, Registrar.

LIVERPOOL SCHOOL OF PHARMACY.

36, Oxford Street, Liverpool.

Principal: J. S. WARD, Ph. Ch., M.P.S.
(*Prize Medallist and South Kensington Prizeman.*)

The next session will commence on Monday, September 1st, with Two Courses of Lectures, one for the October candidates, and the other a full course extending over until the December Examination.

Three out of Four of those who have passed from this School at the recent Examinations have been successful on their first attempt.

A new Prospectus, with full particulars of the School premises, curriculum, fees and testimonials, will be forwarded on application.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, Gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium, 100 Plants, 5s.

CONCILIO ET LABORE.

THE MANCHESTER COLLEGE OF CHEMISTRY & PHARMACY

225, OXFORD STREET, MANCHESTER.

Director: Mr. W. SPENCER TURNER.

The present Session began on
MONDAY, AUGUST 18th,
as advertised.

Intending Students are requested to join without any further delay, as there are only a few vacancies.

WESTMINSTER COLLEGE

TRINITY SQUARE, BOROUGH, LONDON, S.E.

The next Session will commence on Monday, September 1st.

FEES:—

To the October Examination	...	£5 5s.
To the December ,,	... ...	£8 8s.
Six Months' Course	... ...	£10 10s.
Twelve Months' Course	... ...	£15 15s.

At the Pharmaceutical Examinations held last month, the following 29 Students of the Westminster College were successful in passing the MINOR Examination:—

*Mr. A. BANKS
* ,, W. BARKER
* ,, T. N. BROOKE
,, B. H. BUTLER
,, W. CLARKE
,, C. ELLIS
,, H. C. GLANVILLE
,, W. H. GODSLAND
* ,, E. E. HALL
,, J. H. HOPPER
,, A. J. HEMSTEAD
* ,, J. HULLAND
* ,, S. HUGGINS
* ,, G. JACQUES
* ,, J. K. JONES
Mr. R. M. LEWIS
* ,, C. O. MORRISON
,, G. MOOR
,, G. NEALE
,, J. NEWTON
,, F. ROOKLEDGE
,, F. T. SANDERS
,, B. SMITH
,, J. STURDY
* ,, W. SUMNER
,, T. E. TAYLOR
,, A. WALDRON,
,, H. P. WITHERS
,, H. E. YOUNG

PRELIMINARY.

*Mr. R. COLWILL *Mr. N. COUVE
Mr. A. T. RILEY.
* Resident Students.

EVENING LECTURES, Laboratory Instruction and Classes.

Gentlemen engaged during the day, and unable to leave business, may be prepared for the Pharmaceutical Examinations in the evening.

HOURS OF ATTENDANCE.

Minor ... ... Tuesday and Thursday, 7 till 9 p.m.
Preliminary... ... Friday, 7 till 9 p.m.

Preliminary Students may enter the class at once.

"*We have visited the Westminster College of Chemistry and Pharmacy, and with the facilities* Mr. WILLS *has at command, we can scarcely wonder that the whole of his Students pass without difficulty.*"—Magazine of Chemistry and Pharmacy.

For Prospectuses and other information, apply to
Messrs. WILLS & WOOTTON.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 47 out of 51 Pupils passed the last Examinations.

TERMS FOR ADVERTISEMENTS IN THE PHARMACEUTICAL JOURNAL.

GUARANTEED CIRCULATION

7000 Copies Weekly.

Assistants Wanted, Apprenticeships Wanted, Businesses for Disposal, Wanted to Purchase, also Advertisements of a general character (in column).—Seven lines (50 words) or less, 4*s.* 6*d.* Each line (seven words) extra, 6*d.*

Special terms for **Assistants seeking Engagements** *only.*—Four lines (28 words) or less, 2*s.* 6*d.* Each line (seven words) extra, 6d.

Postage stamps *cannot be received*, but payment may be made either by **Cash** in a Registered Letter, or by **Cheque** crossed London and County Bank, by **Postal Order**, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL.

Advertisers are requested to observe:—

1.—That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.
2.—That letters addressed to initials or to fictitious names at a Post Office are not taken in, but are at once sent back to the writers by the Post Office Authorities.
3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers.

Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

J. & A. CHURCHILL, 11, New Burlington St., London, W.

× × × ×

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS
(*From the Royal School of Mines*),
6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.

STUDENTS REASSEMBLE SEPTEMBER 3rd.

Notwithstanding the great mortality at the June and July Minors, over seventy-five per cent. of my students were successful at the two combined. Individual personal instruction, as usual. No demonstrators. All students work *separately*, therefore entry may be made at and for any length of time. Postal teaching for Preliminary and Minor a speciality; books unnecessary, notes sufficient. Send stamp for terms, &c.

LABORATORY CLOSE TO GOWER STREET STATION.

× × × ×

PHARMACEUTICAL PRELIMINARY, LONDON MATRICULATION, AND ALL MEDICAL PRELIMINARIES.

RAPID and thorough preparation, privately and in class. Postal Tuition for these Examinations and Bell Scholarship. For particulars, enclose stamp, Mr. A. DAWES, 1st B.A. Lond., Adderstone, Vardens Rd., New Wandsworth, S.W. (close to Clapham Junction Station.)

THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

At the Examinations held in London this month, 5 Major candidates from this School presented themselves. The following 4 passed:—

Mr. CLOWER	Mr. HANSON
,, GRADIDGE	,, SALMON

17 Minor candidates were recommended to present themselves for examination. The following 13 passed:—

Mr. ADAMS	Mr. GRAY
,, ASTON	,, JAMES
,, BAYLEY	,, JOINT
,, GIBBONS	,, HUGHES
,, FISHER	,, STEVENS
,, FLOWER	,, TIMM

Mr. WATSON

ENGAGEMENTS WANTED.

AS JUNIOR, in a good Dispensing business, with facilities for attending Pharmaceutical lectures. Age 21. 5 years' experience. Salary no object. OGGITY, 14, King St., Wigton, Cumberland.

AS MANAGER or ASSISTANT. Qualified. First-class references. Disengaged. A. P. S., 37, High St., Wigton, Cumberland.

AS JUNIOR or DISPENSER to a Surgeon. Good Dispensing and Retail experience. Age 22. London or West of England preferred. Salary £40. STATIM, Vestry Chambers, Streatham, Surrey.

AS ASSISTANT, out-door, in good Dispensing and Family business. Efficient Counterhand. 12 years' experience and references. Age 26. Disengaged Sept. 1st. ASSISTANT, T. W. Wilson, Chemist, 3, Bootham, York.

AS JUNIOR. 4¼ years' experience. Age 19. Height 5ft. 7½in. Where 2 are kept preferred. Please state hours, &c., A. E. A., 55, Lorne Rd., Northampton

AS Temporary ASSISTANT. Many years' experience in London and country. First-class references. Disengaged from Sept. 1 to 22. CHEMIST, Milton Villa, Shaftesbury Rd. East, Hammersmith, W.

AS ASSISTANT, in town or country. Age 24. Height 5ft. 9in. 8 years' experience. Good references. Salary moderate. Disengaged. W. S., 1, Devonshire St., Brighton.

DISPENSER to Surgeon or Chemist, or situation in Wholesale House, by Minor student. Age 23. Hall qualifications. London preferred. Excellent references. JACKSON, Stonewell Ter., Horncastle.

AS JUNIOR in good house, city or West End. 5 years' experience. Dispensing department preferred. Disengaged. W. R., 186, Richmond Rd., Hackney.

ENGAGEMENTS WANTED.

AS JUNIOR or IMPROVER in a first-class Dispensing house, where a Senior is kept preferred. Age 20. 5 years' experience. Passed Preliminary. Improvement, not salary, object. S., Outwood, Wakefield, Yorks.

APPRENTICE.—The parents of a youth, who has passed his Preliminary examination, are desirous of placing him for three years as an in-door APPRENTICE to a Chemist and Druggist. Premium moderate. Apply, stating terms, in first place, to Mr. CRISPING, Paddock St., Soham, Cambs.

AS JUNIOR, in-door. London preferred. Age 19. Height 5ft. Passed Preliminary. Highest testimonials. Apply, stating hours and salary, to E. A. KEMPTON, High St., Ely, Cambs.

AS JUNIOR. Ætat. 18. Height 5ft. 7in. 4 years' experience. Abstainer. Disengaged September 11th. State hours, &c., to C. H. HAGUE, Braddock & Bagshaw, Ashton-under-Lyne.

AS ASSISTANT, or MANAGER for Branch.—Out-door. 9 years' London and provincial experience. Good knowledge of Dentistry. Age 25. Height 5ft. 8in. First-class references. ALPHA, Fairfield, Bromsgrove.

WHOLESALE.—As COUNTER or WAREHOUSEMAN. Willing to be generally useful. Age 32. Salary 30s. Good references. London only. ALPHA, 6, Charlwood Ter., Putney.

TEMPORARY or permanent MANAGER. A gentleman, qualified, of considerable experience, disengaged on the 25th inst. Thorough Prescriber, Dispenser, Tooth Extractor. CHEMICUS, News Rooms, Ludgate Circus, London.

AS SENIOR or MANAGER. Temporary or otherwise. Good town and country experience. Qualified. Age 28. CHEMICUS, 65, St. Andrew St., Cambridge.

ADVERTISER, who has been accustomed to light Retail and Shipping, wishes to meet with a similar engagement. Age 27. Prelim. State salary, &c., to J. B., 18, Lower Meddon St., Bideford.

AS JUNIOR.—Disengaged. Age 20. Height 5ft. 8½in. 4½ years' experience. D., 34, Oxford St., Mountain Ash.

AS LOCUM TENENS or MANAGER, by a Pharm. Chemist, with first-class experience and highest references. BETA, Mr. Burke, William St., Windsor.

AS MANAGER to a Branch, or as ASSISTANT. Disengaged about September 24th. Can Extract Teeth. Accustomed to Prescribing and Dispensing. Experienced. Aged 40. W. V., 1, Cornhill, Bridgwater, Somerset.

AS ASSISTANT.—Age 28. 3 years' Retail experience. Willing to be generally useful. Out-doors only. Salary 30s. Can Extract Teeth. Disengaged. CHEMIST, 76, Disreali Rd., Putney.

JUNIOR ASSISTANT or DISPENSER. Age 20. Height 5ft. 8in. Good appearance and address. Disengaged 1st September. J. H. W., 7, Head St., Colchester.

AS ASSISTANT.—Out-door. Aged 26. Good experience. Can Extract Teeth. ZEPHA, 3, Whetstone Hill, Ripponden Rd., Oldham.

AS JUNIOR, in good class business, where 2 or more are kept. 6 years' experience. Age 21. Height 5ft. 8in. London preferred. BUCKLEY, 30, Coppice St., Oldham.

UNTIL the end of October.—As ASSISTANT, in first-class Dispensing business. B., W. Baxter, Esq., 325, Kennington Rd., S.E.

A THOROUGHLY competent ASSISTANT seeks engagement for 2 months. Minor qualification and well recommended. Good Dispenser and Prescriber. Age 25. ALPHA, 2, Massie Rd., Graham Rd., Dalston, E.

ENGAGEMENTS WANTED.

AS ASSISTANT. Out-door preferred. Age 26. Height 5ft. 9in. 12 years' experience. Good references. QUERCUS, 15, Burton Cres., London, W.C.

AS MANAGER, SENIOR or TEMPORARY. Aged 37. Registered. Town and country experience. Good references. Disengaged Sept. 2. C. WILLIAMS, 33, Castle Gate, Newark.

MANAGER or SENIOR. A competent and qualified Assistant, with thorough knowledge of French and English Pharmacy, desires engagement. Age 25. 10 years' experience. OMEGA, 19, Inworth St., Battersea, S.W.

ASSISTANTS WANTED.

ASSISTANT (Junior) for better class country market town business. Must be neat and accurate Dispenser, of good address, and willing to make himself useful. Good home comforts offered. Apply, E. BENNETT, High St., Ledbury.

A YOUNG man seeking a permanency, about 21 years of age, required in a good Dispensing and Retail business. One not afraid of work and passed Preliminary, neat Wrapper, Dispenser, and who could Prescribe, and to take occasional charge, to such a comfortable home and fair salary given. Must have first-class references. Apply personally, W. M. COVELL, Hackney Dispensing Pharmacy, 302, Mare St., Hackney, London, E. Established 1308.

EARLY in September.—A qualified ASSISTANT, for about 4 weeks. One who is changing situations preferred. Hours short. Duties light. Address, JOHN ROBINS, Woodford, Essex. Also a Junior ASSISTANT. Permanent. Address as above.

JUNIOR ASSISTANT or IMPROVER, for a light Retail and Dispensing business. Apply, with full particulars, to CAMPION, Harlow, Essex.

AN active JUNIOR. Time given for study. Apply personally, to WALTER DEE, 77, King St. East, Hammersmith, W.

A JUNIOR ASSISTANT.—Immediately. One who has had experience in a Mixed business preferred. Apply, stating age, height, salary required, if a good Dispenser, and to be well recommended from last employer, to PARACELSUS, care of Mr. James Robinson, Pharmaceutical Chemist, Darlington.

IMMEDIATELY.—A competent ASSISTANT, of gentlemanly address. Accustomed to good class business. Apply, with particulars, to G. R. WARREN, 79, Abbey Rd., St. John's Wood, N.W.

ASSISTANT.—Competent business man, with experience in better class provincial houses, equal to Management as required. Salary £60 to commence. Indoors. Hours 8 till 8. If out-doors, proportional arrangement may be made. Apply, full details, to Mr. CLARIDGE, Chemist, Warwick.

AN ASSISTANT, by end of September, with a good knowledge of Dispensing. Age about 23. Apply, giving age, height, salary required, &c., to Messrs. GEORGE & WELCH, Worcester.

A COMPETENT ASSISTANT (early), not under 22 years of age, of good address and experience. One with Minor qualification and desiring a permanent situation preferred. Apply, personally if possible, to HERBERT POTTER, 8, Park Ter., Sutton.

IMMEDIATELY. — A Junior ASSISTANT for the Wholesale. Apply, stating age, experience, references, and enclose carte, to HICKS & Co., Duke St., Cardiff.

EMATCHAM, Homœopathic Chemist, Ipswich, is in immediate want of good Junior ASSISTANT. Full particulars, enclosing carte (to be returned). First class references required.

ASSISTANTS WANTED.

JUNIOR ASSISTANT, to Manage branch. Time for study. State salary, out-door, reference, and when disengaged. Also a vacancy for an APPRENTICE. KEEN, Warwick.

A MANAGER for an open Surgery, with Post Office attached. Must be a good Prescriber and able to Extract Teeth well. Apply in person before 12 or after 6, to Dr. S., 223, High St., Shadwell, E.

JUNIOR ASSISTANT. Must be active and of good address, accustomed to a Mixed country business, and have a fair knowledge of Dispensing. In-doors, where two are kept. Apply, with references, to J. J. PERKINS, Chemist, Lichfield.

AN ASSISTANT, age 21 or 22, at end of August. Dispensing ability necessary, and good references required. Apply, with full usual particulars, to J. C. PARKES, Pharmaceutical Chemist, Hare St., Woolwich.

MANAGER of Branch. 25 to 30 years of age, for country business. Must be well recommended. Unfurnished house found. Send full particulars of experience, stating salary required, &c., and enclose carte, to J. B., 22, Woolwich Common, S.E.

TWO energetic gentlemanly ASSISTANTS, a SENIOR for a Branch (with Minor), and a JUNIOR or IMPROVER. Salaries £50 and £25 respectively, with commission to Senior. Those seeking permanencies preferred. Apply, to R. H. CUMINE, Forest Gate, E.

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AN ASSISTANT for Retail and Prescribing business. Not under 21 years of age. H. R. ADAMS, Whitstable.

IMMEDIATELY. — Junior ASSISTANT for Branch. In-door. Must be well up in Dispensing. Apply, with usual particulars, to COUPLAND & SON, 20, Regent Parade, High Harrogate.

A COMPETENT, but not necessarily qualified, man. Address, STATIM, care of Messrs. Hodgkinson & Co., Whitecross St., E.C.

BY the end of August in a Dispensing establishment. One who has had some experience and can be well recommended. Apply, stating age, salary, &c., to Mr. SHRUBSOLE, Town Hall Sq., Chester.

IMMEDIATELY.—Junior ASSISTANT or IMPROVER, accustomed to Dispensing, for a first-class country Retail business. Time allowed for study. Apply, enclosing carte, to be returned, stating age, height, salary required, &c., to E. BATES, Chemist, Brackley, Northamptonshire.

AN ASSISTANT, for Hospital Dispensing, commencing Sept. 1st till 19th, inclusive. Hours 10 till 5. No Sunday duty. An Apprentice kept. Dinner provided in the Institution, otherwise out-door. Apply, stating age, salary required, and usual particulars, to W. I. PASHLER, Addenbrooke's Hospital, Cambridge.

IMMEDIATELY.—An ASSISTANT, for a first-class country business. Must be a neat and accurate Dispenser, and a good Counterman. Apply, stating age, &c., to PERKS & LLEWELLYN, Hitchin.

AN experienced ASSISTANT, of good address and business habits. Good references. J. PASMORE & SON, 82, King's Rd., London, S.W.

MR. PHILLIPS, Pharmaceutical Chemist, Broadway, Ealing, W., has a vacancy for a qualified ASSISTANT, age not less than 23, who has been accustomed to a good class Dispensing business. Personal application desirable, but applications may be made by letter, in which case carte must be enclosed, which will be returned.

ASSISTANTS WANTED.

SHORTLY.—A competent, obliging and gentlemanly ASSISTANT, possessing legal qualification, in a first-class business where several Assistants are kept. Address, H. M. E., care of Meggeson & Co., Miles Lane, Upper Thames St., London, E.C.

IMMEDIATELY.—A Senior ASSISTANT, 28 to 30 years of age, accustomed to good class Retail and Dispensing. Apply, with particulars, to CRUSE & Co., Chemists, Southsea.

SENIOR ASSISTANT.—Early in September, a thoroughly competent Assistant. Must be quick and well up in Dispensing. About 25 years of age. Minor qualification. Six Assistants kept. Apply to W. THOMAS, 103, Talbot Rd., Westbourne Grove, W.

JUNIOR ASSISTANT, who understands Post Office and Single Needle. Must be a neat Dispenser and have good recommendation. Apply to MANAGER, 50, Queen's Rd., Brighton.

MESSRS. ARGLES & STONHAM, Maidstone, have a vacancy for a Junior ASSISTANT. Work principally in the Wholesale. Apply by letter, stating age, qualification, and salary required.

A JUNIOR, or one having served part of his time, for a large middle-class Retail business. Good character required. In-door. With full particulars, apply T. PARKER, 9 & 10, Bridge St., York.

A QUALIFIED ASSISTANT, accustomed to good Dispensing and Retail business. Age 22 to 25. Send particulars, with photo and references, or apply personally, to CLARKE & HORNBY, Richmond, Surrey.

A GOOD Dispensing ASSISTANT, about 22 or 23 years of age, with country experience. HIGGINS & Co., Chemists, Farnham, Surrey.

AN ASSISTANT, age 21 or 22, for good class Dispensing and light Retail. One possessing some knowledge of Postal duties preferred. Applicants will please send full particulars, stating height, salary and references. J. T. NEWEY, Chemist, Beulah Hill, Norwood, S.E.

JUNIOR, about 21, early in September, accustomed to Dispensing and good class trade. Could arrange time for study if desired. Address, with full particulars and photo (to be returned), J. C. PERRESS, 48, East St., Brighton.

A JUNIOR ASSISTANT. Out-doors. One that can Extract Teeth preferred. State age, height, experience, and salary required, to CHEMIST, 39, Redcliff Hill, Bristol.

TEMPORARY ASSISTANT, from September 1st—14th. Manager not wanted. WHITROW & Co., Chemists, Tunbridge Wells.

AT once.—A JUNIOR or IMPROVER in a select Dispensing and Family Retail, 30 miles from London. Hours short. Time and assistance given in preparing for the Minor. State salary, with usual particulars, to XERES, Herrings & Co., 40, Aldersgate St., London, E.C.

MANAGER for light Retail, Prescribing and Dispensing business (branch). About 30. Abstainer and married man (having furniture) to live on premises preferred. Able to Extract Teeth. Salary £85, with house rent free. References must be undeniable. Apply, stating age, height, qualification, when disengaged, references, enclosing carte, to GRIFFIN, Chemist, Monument Rd., Birmingham. Also vacancy for an APPRENTICE.

JUNIOR ASSISTANT or IMPROVER for a good country business (Dispensing and Agricultural). No Sunday duty. Time given for study if required. Apply, with full particulars, to Mr. D. JENKINS, Chemist, Bridgend.

LEICESTERSHIRE Provident Dispensary.—DISPENSER. Salary 30s. per week, with unfurnished rooms. Application to be made to the MANAGER, Provident Dispensary, Leicester.

ASSISTANTS WANTED.

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APPRENTICE.—A vacancy occurs for a gentlemanly well educated youth to thoroughly learn every branch of the business. Time allowed for attending lectures, recreation, &c. References to former pupils. Within 10 minutes' walk of Wills' College. Moderate premium required. Address, J. E., 74 Deacon St., Walworth Rd., London, S.E.

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TRAVELLER.—An experienced TRAVELLER, to represent a firm of Wholesale Druggists and Manufacturing Chemists in Transatlantic Countries. Apply, by letter only, to W., 22, Westbourne St., Hyde Park. All communications will be treated as confidential.

ABOUT the end of August.—An in-door ASSISTANT. Age about 30, accustomed to Dispense, Prescribe, and general Mixed trade. One who understands Mechanical Dentistry preferred. Good references and character. Apply, stating salary required and usual particulars, to Mr. A. SMITH, Dental Surgeon and Chemist, 5, High St., Newport, Mon.

A JUNIOR ASSISTANT. Not under 21 years of age. Accustomed to a good-class Dispensing business. Apply, with full particulars, enclosing carte, to JAMES NEWLYN, 9. Wellswood Pl., Torquay.

A JUNIOR for country Retail. Salary, in-doors, £30. Hours 8 to 7.30. Applicants enclose photo., to be returned. One accustomed to Mixed trade preferred. W. L. PRESTON, Dispensing Chemist, Dalton-in-Furness.

A QUALIFIED ASSISTANT for Mixed country business. Must have good experience in this class of trade. Well up in Prescribing and a good Shopman. Christian or abstainer preferred. Apply, with photo. and references, also state age and if single, and say salary expected, out-door, T. M'CALL WHITE, Wigton.

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DISPENSER, in an Institution, near London. Salary £50, with board, lodging and laundress. Address, SYRAX, Messrs. Deacons, 154, Leadenhall St., E.C.

A QUALIFIED ASSISTANT. Apply, stating age, height, experience, salary required, &c., to GLAISYER & KEMP, Brighton.

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Of Chlorate of Potash and other drugs usually employed for throat affections. Chlorate of Potash with Borax; Chlorate of Potash with Chloride of Ammonium; Chloride of Ammonium with Borax, &c. The pure drug, without any addition, is compressed in very small lenticular discs, which are easily retained in the mouth while singing or speaking. The great advantage of these Tablets over the ordinary lozenges is, that they are free from the irritating saccharine matter with which ordinary lozenges are diluted. They are now almost universally prescribed by the profession in preference to the usual gargles, for when allowed to dissolve in the mouth the saliva becomes charged with the salt, carrying it directly to the affected parts, thus really securing all the beneficial effects of a continuous gargle without the injurious exertion which was required by the old method. Supplied in Packages at 1s., 2s. and 3s.

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Their convenience and utility will at once be apparent on examination.

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Morphiæ Sulphas ....1-6 grain.	Morphiæ Sulphas ....1-12 grain.
Morphiæ Sulphas ....1-8 grain.	Atropiæ Sulphas ....1-250 grain.
Morphiæ Sulphas ....1-12 grain.	Atropiæ Sulphas ....1-60 grain.
Morphiæ Sulphas ....1-3 grain.	Atropiæ Sulphas ....1-100 grain.
Atropiæ Sulphas ....1-120 grain.	Atropiæ Sulphas ....1-150 grain.
Morphiæ Sulphas ....1-4 grain.	Strychniæ Sulphas ..1-60 grain.
Atropiæ Sulphas ....1-150 grain.	Strychniæ Sulphas ..1-100 grain.
Morphiæ Sulphas ....1-6 grain.	Strychniæ Sulphas ..1-150 grain.
Atropiæ Sulphas ....1-180 grain.	

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Burroughs, Wellcome & Co. Manufacturing Chemists,

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TABLE OF CONTENTS.

Page
"The Month" 161
Guarana. By Dr. Squibb 165
Japanese Camphor: its Preparation, Experiments, and Analysis of the Camphor Oil. By H. Oishi 166

Page
EDITORIAL ARTICLES AND NOTES:—
The Meeting of the British Association in Canada 167
Notes: — A Correction — Petitions against the Medical Bill—Pharmacopœia Revision..... 168

Page
BRITISH PHARMACEUTICAL CONFERENCE:—
Further Contribution to the Pharmacy of Linseed. By T. Greenish 169
BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE:—
Fifty-Third Annual Meeting:—
The President's Address..... 173

Pharmaceutical Society of Great Britain.

17, BLOOMSBURY SQUARE, LONDON.
RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

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SPECIAL NOTICE.

The Library and Museum will not be open in the evening during August and September.

The Library and Museum will be closed from September 1st to September 13th, both dates inclusive, for revision.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *thirty-nine* annuitants, receiving £1320 per annum, and casual relief is also granted, amounting to nearly £700 per annum, involving a total annual expenditure of upwards of £2000.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of Half-a-crown are entitled at each election of Annuitants to	ONE Vote.
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Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

CATALOGUE OF THE MUSEUM.

The Catalogue of the Museum may be obtained from the Secretary, price 2s.; or by post, 2s. 4d. Each Member, Associate, and Apprentice of the Society will be supplied with one copy *gratis*, on application to the Secretary.

NORTH BRITISH BRANCH.

The Society's Rooms at 119A, George Street, Edinburgh will be closed from and after Saturday, August 16th, and the new premises at 36, York Place, Edinburgh, will be opened on Wednesday, October 1st.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-THIRD SESSION, 1884—85.

CHEMISTRY AND PHARMACY..... Professor REDWOOD and Mr. DUNSTAN.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratories.

THE LECTURES ON
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Comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects are fully illustrated with experiments, diagrams and specimens, and examinations of the class are held on those subjects which have been previously treated of in the lectures.

Additional lectures upon Chemistry and Physics are also delivered by Mr. Dunstan during the course.

The class in Practical Dispensing and the Reading of Prescriptions is conducted by Mr. Joseph Ince, and meets twice a week at 5 p.m.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

Comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures are fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is expected that all pupils will attend these examinations.

INSTRUCTION IN
PRACTICAL CHEMISTRY

Is conducted in the Laboratories by the Professor and Demonstrators. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date.* A Junior course occupies about five months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and is dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He expects all pupils to attend these classes.

Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or to their Assistants in the Lecture Theatre, or Laboratories,
17, Bloomsbury Square, London, W.C.

PHARMACEUTICAL SOCIETY.

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The *Pharmaceutical Journal*, in a very favourable review of nearly two pages, concludes by saying, "There is much and varied information in its pages, which will prove useful to every Pharmacist."

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15	„ FIRST „ ... ... Toilet „ ...	100	31 12 0	15 16 6	7 19 0
16	„ GOOD „ ... ... „ „ ...	100	23 14 0	11 17 6	5 19 0
17	„ SECOND „ ... ... „ „ ...	100	18 10 0	9 6 0	4 14 0
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21	SOLID, FIRST „ ... Toilet „ ...	200	18 10 0	9 6 0	4 14 0
22	„ SECOND „ ... „ „ ...	200	12 5 0	6 3 0	3 2 0
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"We have tasted the Ginger Ale and like it very much; indeed, it is the best thing of its kind we have met with."

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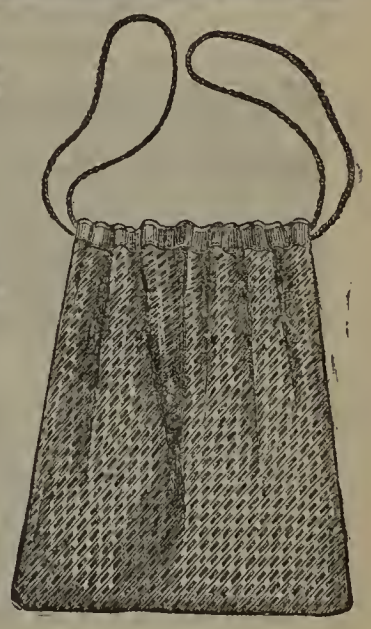

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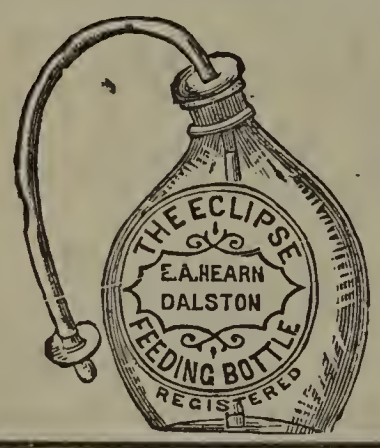

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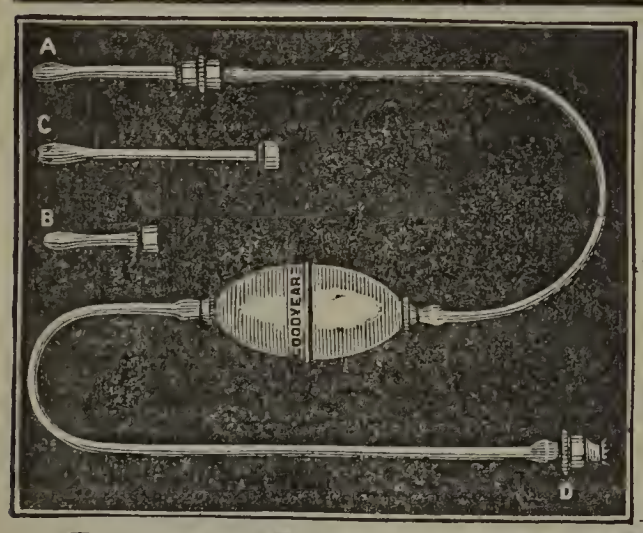

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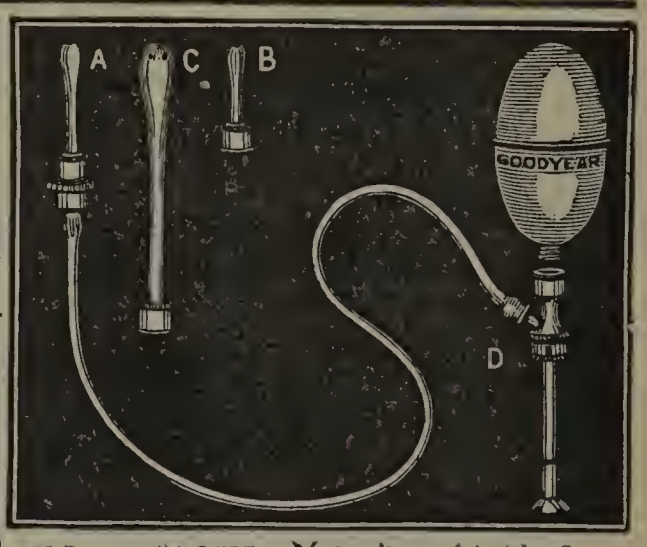

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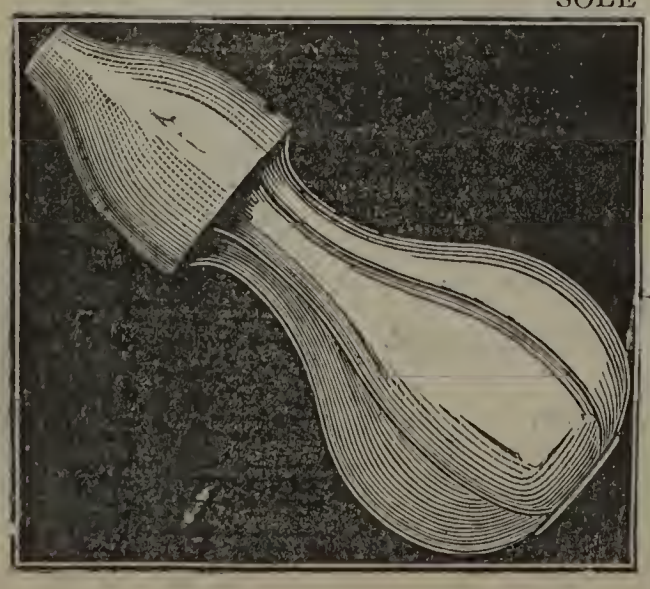

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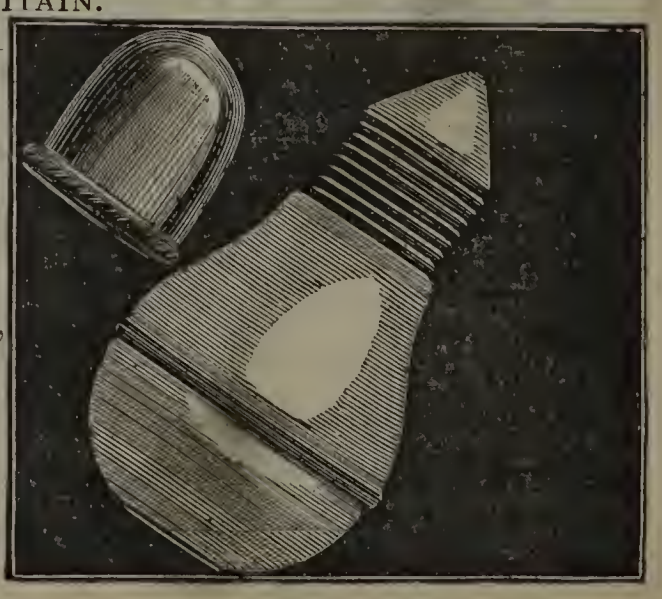

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ESTABLISHED UPWARDS OF FIFTY YEARS.

SYDNEY, NEW SOUTH WALES,

JUNE 11, 1884.

ENO'S FRUIT SALT IN EQUITY.

Before his Honor the PRIMARY JUDGE.

ENO *v.* DAVIES AND ANOTHER.

Mr. J. E. Solomon, Q.C., and Dr. Donovan, instructed by Mr. De Lissa, for the plaintiff; Mr. Owen, Q.C., and Mr. Nash, instructed by Messrs. Bull and Bull, for the defendants.

This is a suit instituted by James Crossley Eno, of Pomeroy Street, Hatcham, Surrey, England, to have the defendants, William Davies and James Channon, trading as William Davies and Co., Goulburn, and Harbour Street, Sydney, ordered to take a certificate of registration for a trade mark called "The Australian Fruit Salt" off the file at the Registrar General's office, and also to have them restrained by perpetual injunction from using the title to any other commodity. The plaintiff claimed that the trade mark was an infringement of his own, viz., Eno's Fruit Salt, Fruit Saline, and Fruit Powder. Consequential damages were also claimed. The defendant's mark was registered in this Colony two months before plaintiff's.

His Honour, in giving judgment, said he had no doubt that the case came within the principle laid down in the cases which had been cited wherein the Court enjoined a defendant not to continue the use of his trade mark. Although there were some important points of distinction in the goods, still there were points of resemblance which were calculated to induce persons to believe that they were obtaining the plaintiff's, when in reality they were buying the defendant's. The bottles were about the same weight and shape, and a purchaser of the defendant's would hardly know he had not got Eno's until he opened the package. Looking at the two bottles, he thought purchasers were exceedingly likely to be misled, because a man was not supposed to carry his last bottle with him in order to see that he was getting the same article, and persons buying were not supposed to be always suspicious that frauds were being practised upon them. He considered the term "fruit salt" sufficiently distinctive to be in itself a trade mark, and it had been proved in evidence that people generally asked for it by that name. The resemblance in the bottles and in the printing on the wrappers was so close that he regretted he could not say that it resulted from accident or was consistent with innocence. The distinctions seemed to have been carefully studied in order to escape, if possible, the results of imitation. The defendants had brought out their article just when the plaintiff's had taken a gigantic jump in public estimation, and had acted in such a way as to induce him to believe that they intended to lead the public to think they were buying plaintiff's goods when they were served with theirs. There was fraud which tradespeople unfortunately did not think much of, but which the Court always regarded with the greatest reprehension. He did not think the argument as to the second section of the Act had very much to do with the case. When the defendant registered he must have obviously known that Eno's Fruit Salt was in the market. He had no more right to register than he had to sell. He did not think the Act in any way interfered with the powers which the Court of Equity possessed before it became law. The Act had only been passed to afford a speedier and readier remedy to those who registered under it. The seventh section evidently contemplated that such a suit as the present one should be taken by a person who considered he had been wronged, as the plaintiff had been. He would grant the injunction in the terms of the prayer, restraining the defendants from using the trade mark, on the ground that it was an infringement on the plaintiff's prior and exclusive claim. He would order them to take such proper and necessary steps as were possible to take the certificate of registration off the file, but if a power greater than theirs stood in the way in the matter, they would be relieved from attachment. He did not see how he could compel the Registrar-General, who was an officer appointed by Parliament, to do a certain thing, to cancel the certificate, especially as he had not been made a party to the suit. The certificate, however, could be delivered up, because it was part of the subject matter of the suit. He would order the defendants to pay costs up to the hearing, and would direct an issue as to consequential damages to be tried before a special jury of four in the Jury Court on a day to be named. He would make the question of costs of these further proceedings dependent upon the result, because it might be that he would not give plaintiff his costs if he did not recover a substantial amount.

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Prepared only at Eno's Fruit Salt Works, Hatcham, London, S.E., by J. C. Eno's Patent.

"THE MONTH."

This month and the last are pre-eminently the botanist's hunting season, more plants being found in good condition for collection and study during these two months than in any other period of the year. Many which commenced to flower last month have lasted until now, but a few do not usually begin to blossom until the middle or end of August. Amongst these may be mentioned colchicum, tansy, soapwort, camomile, peppermint, spearmint and pennyroyal.

One can hardly walk along the London streets without inhaling a whiff of the fragrant odour of the lavender carried by itinerant vendors, and doubtless in the country the air is redolent of it and of peppermint in the districts where these are cultivated and where the process of distillation is in full swing. Several rare or local plants may now be looked for in holiday rambles in the country. In the north the curious glaucous foliage of the oyster plant, *Mertensia maritima*, is conspicuous on sandy shores, and *Psamma baltica* is in full flower. The rare orchids, *Corallorhiza innata* and *Malaxis paludosa*, may be looked for, and *Haloscias scoticum* will be just ripening its fruit, while *Carex incurva* is almost over. In a few limestone woods in the north *Actæa spicata* may now be found with black berries, a form of fruit rare in the natural order to which it belongs and which separates the genus from *Cimicifuga*, which has capsular fruit. Recently Mr. Ware, of Hale Farm Nurseries, Tottenham, has forwarded two specimens of *Actæa spicata*, one with berries of a white and the other of a red colour. In the south-east of England *Sonchus palustris* and *Sylvia pratensis*, *Carduus eriophorus* and *Centaurea solstitialis* will be found in blossom; in the Isle of Wight, *Calamintha sylvatica*, and in the east *Verbascum pulverulentum* and *Artemisia campestris* and *Medicago falcata*. In the south-west *Lobelia urens* will be coming into blossom, and *Scrophularia Scorodonia*, *Polygonum maritimum*, *Euphorbia Peplis*, *Scirpus Holoschœnus*, *Teucrium Scordium* and *Cyperus longus* will be in good condition for collecting by those who are fortunate enough to meet with them and who, it may be hoped, will take but few specimens and scatter the seed when possible. During this month and the next is the best time for collecting henbane, stramonium and belladonna seeds. It may interest some readers, who only know the oyster plant from dried specimens, to observe that the plant grows quite prostrate, and that the seeds or pyrenes fall off while still green, like those of *Impatiens Noli-me-tangere*, and bury themselves in the sand. The pericarp is somewhat bladdery, and has an appearance of drops of moisture in it, but it soon turns black and shrivels. The succulent leaves turn black with the least pressure, but it is instructive to observe that portions of the plant broken off on the hot sand will dry perfectly and retain their glaucous hue, hardly shrivelling at all. In the pretty little *Parnassia palustris*, which is now in full flower, but absent from the south-west of England, the stamens are at first quite short and only level with the stigma which they cover, but as the pollen ripens the filaments elongate, and ultimately bend quite back so as to lay the anthers between, but outside, the petals.

From the Botanical Gardens at Cambridge, Mr. R. Lynch, the curator, writes that the Japanese peppermint plant, *Mentha arvensis*, var. *piperascens*, is now in blossom, also *Urginea Scilla* and *Cassia marilandica*, or American senna. Other plants used in medicine which may now be seen in blossom in botanical gardens are scammony, *Lactuca virosa*, liquorice, pellitory of the wall, white horehound, balm, vervain, feverfew, and wormwood.

In the *Journal of Botany* a new British scale moss, *Marsupella sparsifolia*, Lindl., is figured and described. There is also an interesting note on the botanical terms for "pubescence," by Mr. T. B. Forbes, F.L.S., with an attempt to define the terms in use, twelve in number, more clearly. This article is worthy of perusal by all teachers of botany, and by botanists preparing descriptive floras, some of whom use botanical terms in a somewhat unscientific manner.

Some recent experiments made by Messrs. Bounier and Mangin (*Comptes Rendus*, xcix., p. 160) indicate that the effect of light on tissues without chlorophyll,—such as roots, rhizome, flowers, blanched plants and parasitic plants without chlorophyll, *e.g.*, *Monotropa*,—is to decrease the intensity of the respiration, more carbonic acid being given off and oxygen absorbed in darkness than in light. The amount of oxygen absorbed is, however, in the same proportion to the carbonic acid given off in light as in darkness.

Dr. J. Hosack Fraser has lately recommended *Asclepias incarnata* as a speedy, potent and reliable diuretic, possessing the advantage of frequently acting as a stomachic and of not causing any gastro-intestinal disturbance. The dose given is ℥ss. to ℥j. of the fluid extract every three hours. He states that he has found it to succeed admirably with cases in which well known diuretics have entirely and signally failed (*Pract.*, Aug., p. 141).

Dr. J. Mortimer Granville publishes in the *Lancet* (Aug. 10, p. 272.) a prescription for the relief of gout, which he states gives satisfactory results in acute and sub-acute gout, relieving the pain almost immediately, reducing swellings and raising the proportion of urea in the urine from 50 to 100 per cent. The formula he gives is as follows,—Ammonii chloridi ℥jv., potassæ chloratis ℥ij., glycerini ℥xij., tincturæ iodi ℥ij., aquæ ad ℥xij.—Misce. The dose is two tablespoonfuls every third, fourth or sixth hour.

A new use has been found for pilocarpine, by Dr. T. C. Eager, in the treatment of diabetes. In the *Lancet* (August 16, p. 275) he describes a case which was cured by the use of pilocarpine and pepsine with appropriate dietetic treatment.

Fluoride of quinine has recently been recommended by Dr. Weddell, of Calcutta, in the treatment of enlarged spleen. He has investigated the action of fluoric acid and the fluorides, and has come to the conclusion that in cases of chronically enlarged spleen, of malarial origin, the effects obtained are often very striking. In very small doses the fluorides have produced marked benefit in cases of rickets and other diseases characterized by malnutrition of the osseous system. Of the salts of fluoric acid Dr. Weddell considers those of quinine or quinetum (*i.e.* of the mixed cinchona alkaloids) to be the best. (*Brit. Med. Journ.*, Aug. 16, p. 329.)

The rhizome of *Menispermum Canadense* has been examined by Mr. H. L. Barber, who reports (*Amer. Journ. Pharm.*, Aug., p. 401) that besides an alkaloid that appears to be identical with berberine he has found in it a second alkaloid, which has been named "menispine." It was obtained as a whitish amorphous powder by the precipitation of an aqueous

solution of an alcoholic extract with carbonate of sodium after the removal of the berberine, and was at first thought to be either oxyacanthine or menispermine; but it differed from both these by its greater solubility in water, alcohol and ether, and from menispermine in possessing a very persistently bitter taste.

Dr. Peckolt, of Rio Janeiro, who has contributed so much to the history of South American plants, has published (*Pharm. Rundschau*, Aug., p. 166) a communication upon the fruit of the "calabash tree" (*Crescentia Cujete*, L.). The plant is generally supposed to have been introduced into America from Africa by negroes; but Dr. Peckolt says that the Portuguese found it there upon their arrival: at any rate it has long been utilized by the natives for economical and medicinal purposes. The flesh of the not quite ripe fruit and the expressed juice of the fruit are popularly esteemed as medicines, and Dr. Peckolt confirms the estimate of the latter as a laxative. An alcoholic extract, in doses of 0·10 gram, had the effect of a mild aperient, and the quantity could be increased to 0·5 gram, which exercised a strongly drastic action, without griping or ill-effects. As an application against erysipelas the fresh pulp is boiled with water until it forms a black paste, to which vinegar is added, and the whole boiled together, after which it is spread upon linen. A chemical examination of the fresh fruit pulp yielded a new organic acid, crystallizing in plates, to which the name "crescentic acid" has been given. It was obtained by exhausting with water an alcoholic extract of the pulp, treating the aqueous solution with lead acetate, suspending the lead precipitate in water and decomposing and removing the lead, then evaporating the solution to a syrupy consistence and leaving it to crystallize in a cool place. Besides crescentic acid there were found tartaric, citric and tannic acids, two resins, a bitter and an aromatic extractive substance, and a colouring matter that appeared to resemble indigo.

The American menthol from the oil of *Mentha piperita*, for which the name "pipmenthol" has been suggested (see before, vol. xiv., p. 1056), has been examined by Professor Trimble, who reports (*Amer. Journ. Pharm.*, [4], xiv., 405) that there is sufficient physical difference between it and the menthol from Japanese or Chinese oil of peppermint to warrant the employment of different names. The sample examined had the characteristic odour of *M. piperita*, whilst the commercial menthol has a peculiar odour resembling a mixture of peppermint with other members of the mint family. The crystals, too, of pipmenthol are snow-white and acicular, whilst those of commercial menthol are more or less transparent. Chemically, however, the two menthols are considered to be undoubtedly identical, a slightly lower fusing point of the Japanese menthol examined for comparison being attributed to a probable contamination of liquid oil richer in carbon.

Mr. W. H. Greene describes (*Chem. News*, Aug. 13, p. 76) a new synthesis of saligenin, effected by the reaction of methylene chloride upon phenol in the presence of excess of sodium hydrate. The process is a variation of one described by Messrs. Reimer and Tiemann, in which salicylic acid or salicylic aldehyd is obtained through the reaction of chloroform or carbon tetrachloride upon sodium carbolate, saligenin being an oxybenzylic acid.

It has been mentioned already (*Pharm. Journ.*, [3], xiv., 778) that Herr Ladenburg in the course of his researches on the alkaloids had obtained some propyl derivatives of pyridine which appeared to be closely related to the natural alkaloid coniine. After some trouble, the one of these which appeared to be most promising, α-isopropylpyridine, has been isolated and purified. The smell of the base is described (*Berichte*, xvii., 1676) as being strikingly similar to that of coniine, and some experiments on frogs showed that the two bases correspond in their physiological action. The specific gravity of α-isopropylpyridine at 0° C. is 0·8660, that of coniine being 0·8625; the former boils between 162° and 164° C., coniine boiling at about four degrees higher. The two hydrochlorates, the hydrobromates and the platinum salts correspond in crystallization and solubility, but the hydrochlorates and hydrobromates differ slightly as to their melting points. The two bases also behave similarly towards certain precipitants. Herr Ladenburg is inclined to look upon the slight differences hitherto observed as being connected with the optical inactivity of the artificial base, and he thinks it is possible that if the base can be split up into its two optically active components, the dextro-rotatory portion will prove to be perfectly identical with coniine.

In a preliminary communication to the Berlin Chemical Society (*Berichte*, xvii, 1598) Messrs. Lunge and Burckhardt describe a series of fluoresceines obtained by the action of unsaturated dibasic acids upon phenols. Maleic anhydride, derived from malic or fumaric acid by repeated distillations, appears to be the most convenient acid to use. Upon fusing a mixture in the proportion of one molecule of maleic anhydride to two molecules of resorcin during two hours at 150° C. a brown resin is produced which dissolves in alkalies with a yellow-green colour. The resin is washed with cold water and then boiled in water, from which upon cooling a yellow-red flocculent precipitate separates; this, after washing with cold water and drying until the weight is constant, forms a yellow-red powder that under the microscope is seen to consist of small needles, which can be purified by re-crystallization from a mixture of alcohol and ether. An analysis of the substance dried at 60° C. gave results corresponding with the formula $C_{16}H_{12}O_6$; it would, therefore, appear to be an isomer of anhydrous hematein, and to be formed by the combination of one molecule of maleic anhydride with two molecules of resorcin, the elements of one molecule of water being eliminated. Resorcin fluoresceine is slightly soluble in water, but more freely in alcohol and in other indifferent solvents. Its alcoholic solution is reddish-yellow with a greenish fluorescence; but treated with soda ley or ammonia it assumes a magnificent fuchsine-red colour with a strong green fluorescence. It forms lead and barium compounds, from which, however, it cannot be regenerated. When α-naphtol is substituted for resorcin the analogous action does not take place unless a condensation agent is present, such as zinc chloride. With α-naphtol a fluoresceine is obtained, soluble in water, the alcoholic solution of which is pale yellow with a dark yellow fluorescence, and the ammoniacal solution a splendid fuchsine-red colour with a strong yellow-red fluorescence. β-naphtol gives a fluoresceine, the alkaline solution of which is brown with a green-blue fluorescence, and orcin

one giving a brown solution with a moss-green fluorescence.

Operating in a like manner and with similar materials, but in different proportions, Messrs. Von Pechmann and Welsh have obtained a series of coumarin-like bodies (*Berichte*, xvii., 929 and 1646). In this case malic acid and the phenol in proportions representing an equal number of molecules were heated with strong sulphuric acid in an oil-bath to 150° or 160° C., the new compound being separated by precipitation with water and purified by recrystallization. The yield was not uniform, being sometimes abundant and sometimes very small. With ordinary phenol the compound formed was coumarin; with resorcin umbelliferon; with pyrogallol daphnetin; with thymol methylpropyl-coumarin; with hydroquinon an oxycoumarin, isomeric with umbelliferon; with orcin a homologue of umbelliferon; and with β-naphtol a new β-naphto-coumarin. The new compounds are described as presenting in their physical and chemical characters a perfect analogy with the members of the coumarin class previously known. They are all distinguished by their characteristic odour and the peculiar fluorescence of their solutions, and they give all the reactions of coumarin.

Salicylate of atropine appears to be in some quarters displacing the sulphate. Herr Federici prepares the neutral salt (*Pharm. Post*, xvii., 733) by dissolving the atropine (23 parts) with the aid of a gentle heat in a suitable quantity of pure alcohol, and then adding the salicylic acid gradually to complete neutralization (18 parts), the solution being carefully tested with litmus paper during the operation. The liquid is then evaporated in a water-bath to a gelatinous consistence, the mass assuming an amber colour, and the drying is finished in a sand-bath or drying-closet. Exposed to the air the compound quickly deliquesces, but it is said to keep well if properly preserved, though the solution is very unstable.

The pungency occasionally observed in iodine liniment, which some time since formed the subject of a communication by Mr. P. MacEwan (*Pharm. Journ.*, [3], xiii., 615), would appear from some recent papers in a French journal to sometimes extend to the tincture. M. Lambert says (*Journ. Pharm. et Chim.*, [5], ix., 397) that in France when tincture of iodine undergoes change and gives off an acrid, irritating exhalation, it is due to the use of methylic alcohol in which the presence of acetone as an impurity can be detected. He finds that if the impure alcohol be freed from acetone the purified spirit may be used in the preparation of tincture of iodine without inconvenience; but if only traces of acetone be added to the tincture the objectionable odour becomes manifest in a few days. In the opinion of M. Lambert the iodine reacting upon the acetone produces an iodized acetone and acroleine.

Having in some researches upon vegetable alkaloids substituted acetone for alcohol in the exhaustion of the crude material, M. Schlagdenhauffen states (*L'Union Pharm.*, Aug., p. 356) that he was surprised at not always getting concordant results with the two solvents, the final results of the operation upon an acetone extract sometimes yielding alkaloidal compounds that were not obtained from an alcoholic extract. He was, therefore, led to distil some samples of commercial acetone and obtained a yellow brown residue with alkaloidal properties and resembling the ptomaines in their physiological action. It was partially soluble in water and the remainder was dissolved in hydrochloric acid, both solutions giving similar precipitates with alkaloidal reagents.

According to Messrs. Hautefeuille and Perrey (*Répertoire*, xii., 360), there are three distinct phosphoric anhydrides: one crystalline, another amorphous and pulverulent, and a third amorphous and vitreous, the latter two being polymers of the first. All three may be seen formed in burning phosphorus in a glass tube traversed by a current of dry air, the crystalline anhydride being deposited in the colder parts of the tube, the pulverulent anhydride in the moderately heated part, and the vitreous anhydride in the part heated to redness. The crystalline anhydride may be obtained separately by distillation, at a temperature below 250° C., of the products of the complete combustion of phosphorus; it forms transparent colourless, strongly refracting crystals. At a little above this temperature the crystals undergo polymerization and are converted into the amorphous pulverulent form, whilst the vitreous form is produced upon heating either of the others to redness under pressure. Both the amorphous anhydrides are convertible into the crystalline form by sublimation.

M. J. B. Schnetzler, in a communication recently made to the Paris Academy of Sciences (*Comptes Rendus*, xcix., 226) concerning the antiseptic properties of formic acid, makes the observation that it is fatal to the *Bacterium subtile*, one of the microbes most difficult to kill. M. Schnetzler states that after resisting for an hour the action of boiling water, this bacterium may be killed instantaneously by formic acid, it being sufficient for this purpose to add a drop of water containing $\frac{1}{1000}$ part of formic acid to a drop of water teeming with thousands of the bacteria. The fluid so treated may be introduced into the digestive tract with impunity. The author recommends that the action of formic acid should be tried on the cholera bacillus, and it may be suggested that its action on *Bacillus anthrax* is equally deserving of experiment. If successful the use of a bath containing one part in one thousand of formic acid for washing imported wool might save the lives of many of the woolsorters at Bradford and elsewhere.

M. C. Chamberland (*Comptes Rendus*, xcix., p. 247) has conceived the excellent idea of turning to account for sanitary purposes the simple method used by M. Pasteur for separating microbes from their medium of culture. He finds that even the most impure water, after filtration through a porous porcelain tube, is perfectly freed from germs and microbes. Under a pressure of two atmospheres, twenty litres of water per day can be obtained from a tube 0·20 m. in length and 0·025 m. in diameter. Tubes so used can be cleaned by plunging them in boiling water or by heating them in a flame till the organic matter coating the exterior is destroyed. He proposes, therefore, that porous porcelain vessels should be used as filtering media; the external surface being exposed to the impure water.

In an interesting paper read before the Manchester Literary and Philosophical Society, Mr. F. J. Faraday broaches the question as to the explanation of the effect exercised by vaccination and dismisses as crude the theory that the vaccine uses up some

material only rarely elaborated in the body and necessary for the development of the microbe. He appears to prefer to look for an explanation in some mysterious "educational influence" developed in a struggle for existence between the microbes and the living cells of the body. The "resisting vigour" resulting from this education he compares to the apparently instinctive movements observed by Darwin in the tips of the radicles of plants, which he attributes to an "apparently muscular memory" perfected by practice. He seems to think it probable that in nature no experience fails to leave its impress and its influence, and points as an illustration to smokers who overcome the nausea caused by the first mild cigar and "educate the cells of which they consist into the enjoyment of even strong Havannas." Quite in accordance with these opinions, Mr. Faraday concludes by saying that "reduced to its ultimate expression, animated nature would appear to consist of Buffon's organic [organized] molecules *plus* the principle of organic memory, as inorganic [? unorganized] nature is inert matter *plus* the principle of motion.

In a communication made last week to the French Academy (*Comptes Rend.*, xcix., 331), M. Tayon records the interesting observation that neither blood nor excreta taken from a typhoid patient is capable of conveying infection of that disease when injected directly into one of the lower animals. But if the blood be added to sterilized broth, a turbidity results in about twenty-four hours, due to the development of multitudes of microbes, and the liquid is then capable of inducing the typhoid lesions in a guinea pig, causing death in periods ranging between twenty-five minutes and forty-five hours, and to a less virulent degree in sheep, dogs and cats. Pigeons, doves, rabbits and white rats, however, are refractory to this liquid, though in transmission through a guinea pig the microbes appear to acquire an increased virulence and are then capable of producing fatal typhoid in cats, sheep and chickens, after which stage rabbits also are susceptible to their influence; but in every case an intermediate cultivation is necessary. It would appear, therefore, that typhoid microbes, which when magnified one thousand diameters appear as small granulations or very mobile short rods, unlike the organisms peculiar to charbon or cholera, require an alternation of surrounding conditions for their development, resembling in this certain intestinal parasites.

Surgeon-Major N. Alcock has contributed to *Nature* (Aug. 21, p. 401) an interesting communication on the reason why tropical man is black, in which he suggests that as in the lowest animals pigment cells placed behind a transparent nerve termination exalt its vibration to the highest pitch, the reverse takes place when, as in the negro, the pigment cells are placed in front of the nerve terminations, and that the black pigment in the skin serves to lessen the intensity of the nerve vibrations that would be caused in a naked human body by exposure to a tropical sun; that in fact, the pigment plays the same part as a piece of smoked glass held between the sun and the eye.

Some recent investigations by Dr. Falk, communicated to the Physiological Society of Berlin, concerning the action of poisonous and other substances formed in the nascent state in the human body, go to show that they are not characterized, as chemical elements *in statu nascendi* are, by greater energy. The substances experimented with were emulsin and amygdalin, myrosin and myronic acid, and hydroquinone formed from arbutin.

In the current number of the *Philosophical Magazine* (p. 120) Messrs. Turpin and Warrington have an interesting note on certain experiments which have been supposed to illustrate the viscosity of ice. It has been observed that when a metal wire with heavy weights attached to its two extremities is slung across a block of ice suitably supported the wire makes its way through it, the ice reforming behind the wire after its passage, so that after the wire has passed right through the block remains entire. Some results obtained by the authors lead them to the conclusion that when the experiment is conducted at a temperature not lower than 0° C., the chief factor is the lowering of the freezing point by pressure and not the plasticity of the ice. The explanation they give is that when the wire starts on its journey its upper surface is in contact with ice-cold water and its lower is in contact with ice. The pressure of the wire tends to make the ice beneath it melt, but before this can occur the heat rendered latent by liquefaction must be supplied, and through the conductivity of the metal wire this is derived from the water above, which is frozen in consequence. The newly formed water is forced upward, round the wire, and the same process is repeated until the wire has made its way through the block of ice. When string is used instead of wire, as might be expected, the same result is not obtained, and generally it was found that the time occupied by the passage of different wires through ice under similar conditions increased in proportion as the conductivity of the metal from which the wire was made decreased. At a temperature below −1° C. the movement was much more slow, and could only be attributed to the plasticity of the ice.

At the close of a lengthy paper on a "Recalculation of the Atomic Weights," by Mr. F. W. Clarke, Chief Chemist to the United States Geological Survey, which has been reproduced in the *Chemical News* from the 'Smithsonian Miscellaneous Collections,' the author sums up the bearings of the research upon the hypothesis of Prout that the atomic weights of all the elements are multiples of that of hydrogen. Analysing a table showing the revised atomic weights of sixty-six elements he points out that when calculated in relation to oxygen taken as 16 the atomic weights of forty of them fall within the limits of one-tenth of a unit of whole numbers. Of the other twenty-six that appear at first sight to be exceptions the atomic weight attributed to about one-third may be eliminated as being still too imperfectly determined to carry much weight in the discussion, and reasons are mentioned for supposing that some of the other seeming exceptions are not inexplicable. In short, admitting half multiples as legitimate, Mr. Clarke considers it more probable that the few apparent exceptions are due to undetected constant errors than that the great number of close agreements should be merely accidental. He says that he began this recalculation of the atomic weights with a strong prejudice against Prout's hypothesis, but the facts as they have come before him have forced him to give it a very respectful consideration. All chemists must at least admit that the strife over it is not yet ended and that its opponents cannot thus far claim a perfect victory.

GUARANA.*

BY DR. SQUIBB.

This substance is a rude heterogeneous mixture. Neither the ingredients nor their proportions have ever been known with any useful degree of accuracy, and it is only known that they vary largely, not only from time to time, but in different rolls of every single package ever met with in the markets; and, probably, this is one reason why the composition has never been known.

It is made in the country of the Guaranis, a large tribe of half savage South American Indians; and it is highly probable that different parts of the tribe make it in different ways. From the known habits of such people, and the traditions of how they make all such mixtures as this, it is hardly probable that it can be even roughly accurate to any formula, or that it can be either cleanly or wholesome; and, certainly, any one who investigates it much, as the writer has of late done, will get odours and reactions that will remind him of what he has read of the medicaments of savages, both of ancient and modern times. The Guaranis seem to have been cunning enough to have kept their secret of this mixture very well. Thirty years ago, when the writer was in Brazil, guarana was met with chiefly made rudely into the form of ducks, lizards, and other things familiar to the Guaranis. It was not then much used, and the texture was very different from what it is now, being more homogeneous, and more resembling cocoa or chocolate in appearance, taste and odour. It has always been said to consist largely of the seed of *Paulinia sorbilis*, and the fragments of this seed have been identified in the pieces. but there are evidently many other ingredients, while the mass consists largely of starch.

How such a substance can ever have been so largely accepted in the materia medica, can hardly be accounted for on any other basis than that of fashion. It had only been a very short time in use, on the statements of travellers and enthusiasts, when it was found to contain a large proportion of caffeine, and this caffeine was traced to the seeds of *Paulinia*, and these were, doubtless, justly supposed to be the active medicinal agent. As a natural result of this, an effort was made to get the seeds for use, so as to be able to discard the guarana. But throughout many years past the efforts to get these seeds in any larger quantity than small sample parcels have been fruitless. The writer and others have repeatedly sent out orders without limitation of price, both directly to native houses, and through large importers, but the universal reply was that those who collected them would not sell them. The inference is that they made more money on them by using them as an ingredient in guarana, and that they were astute enough to see that if they sold the seed the demand for guarana would soon fall off; and this inference is the chief if not the only indication that they are the principal, if not the only ingredient of value in guarana. The time will probably come when these seeds will be obtainable, and as they contain much more caffeine than any other ordinary source of this principle, they will be a valuable acquisition to the materia medica. If there should occur any possibility of monopolizing them, even for a moderate length of time, some enterprising, money-making firm may be depended on to take advantage of it.

Some three years ago guarana was in great abundance in all of the principal drug markets of the world, but especially plentiful in London and New York, and the price ran down to about 65 cents per pound,—a price that some would be glad to pay for *Paulinia* seed. It is true that the quality was generally very low, and gave evidence that the stuff was half mixed, and hurried into the markets by every means possible. The enormous stock was, however, soon all taken up under the stimulus of the low prices, and the preparations were advertised and pushed into use, so as to start a fashion which has not yet died out. During the past year the drug has become increasingly scarce and dear, until it now sells, as fast as it can be obtained, at about 3·50 dollars per pound by the package in first hands, and for any proper use of it at least one-fourth of the rolls have to be rejected. This makes it so very dear in proportion to its real therapeutic value that it seems now high time to reject it, and look for a substitute, especially in consideration of the fact that as a heterogeneous mixture of unknown composition, secretly made by half savages, it never should have been accepted. The scarcity of it now is reported to be in consequence of its having become fashionable as the basis of a drink, probably fermented, among some half civilized South American races.

Its principal use in medicine has been in the form of a fluid extract, and within the past ten years the writer has had a constantly increasing demand for it up to the present time; but from the considerations above mentioned, he abandons it altogether and dismisses it from his list, substituting for it a fluid extract of green or unroasted coffee, for any who may desire a substitute.

As caffeine has always been the generally recognized active principle of guarana, it was important to know how much caffeine it contained; therefore, a good specimen of guarana and the fluid extract of well selected guarana were both assayed by the following process,—the process being adopted after many trials of other processes which were less successful in the writer's hands.

Ten grams of powdered guarana and two grams of caustic magnesia are mixed with 100 c.c. of water, and the mixture boiled for five minutes, the result being a consistent paste from the amount of starch present. Add to this paste while hot 50 c.c. of strong alcohol, stir thoroughly, and having transferred the whole to a filter drain off the liquid and percolate the residue with a mixture of 60 c.c. of water and 40 of alcohol. Boil the residue a second time with 100 c.c. of the same mixture of alcohol and water, and again drain and percolate it until exhausted, or until the total liquid amounts to 300 or 350 c.c. Evaporate this on a water-bath to about 20 c.c., and transfer it to a vial or flask, rinsing the last portions in with a little water. Add to it 25 c.c. of chloroform, agitate the mixture vigorously, allow it to separate and draw off the chloroform solution into a tared capsule. This separation of the liquids is best effected by shaking them in a separating flask of a conical shape furnished with a stop-cock at the lower, small extremity; but if such a thing be not at hand, the separation can be conveniently effected by having a duplicate cork for the flask or vial in which the shaking is done. This cork is perforated with two small glass tubes, one of which reaches nearly to the bottom of the flask, and projects about half an inch through the cork outside,—and the other passes just through the cork and projects about an inch outside. Both tubes are stopped outside, preferably by short pieces of rubber tubing and pinchcocks. Thus arranged, and the liquids having been allowed time to separate perfectly, the mounted cork is put in the place of the one used during the shaking, and the flask is gently inverted and placed in a convenient holder or stand. Allowing a few moments for the re-settlement of the liquids, the tared capsule is placed under the exit tube, and the rubber tube is dexterously slipped off without the loss of any of the chloroform solution. Then by loosening the pinchcock on the tube for the admission of air, and compressing the rubber tubing with the finger and thumb, air may be gently admitted until all the chloroform solution has run into the capsule. The flask is then turned up,—the corks exchanged,—25 c.c. more chloroform added, and the shaking and separation repeated. This chloroform washing is repeated a third time, and if great accuracy be desired, a fourth time. The chloroform solution is then evaporated to dryness, when it leaves the caffeine white and nearly pure. In one assay the four chloroform washings were evaporated in separate tared capsules, and gave respectively ·440,

* From *Ephemeris*, July, 1884.

·037, ·005 and ·001 gram. Total ·483 gram, equal to 4·83 per cent. of caffeine. If further purification of the caffeine be desired, it may be done as in the assay of tea.

It is generally stated by authorities that guarana yields 5 per cent. of caffeine, and it is possible that some pieces might be selected that would yield this proportion, but the figures just given were from a select piece; and the fluid extract, although made from selected pieces from which perhaps one-fourth of that of a good commercial quality had been rejected, gave on assay, only 4·3 per cent. The best parcels as found in the market, if powdered and used without selection, would probably give a preparation yielding less than 4 per cent.

Although the individual trying these substances physiologically is not fastidious, it required a good deal of courage to swallow preparations of such a mixture as guarana; nevertheless, it was carefully tried, and it was found to require just about a fluid drachm to give the effect of 3 grains of caffeine,—3 drachms of coca, or 70 grains of tea. Now a fluid drachm of a fluid extract containing 4·3 per cent. caffeine would contain 2·58 grains of caffeine, so that 2·58 grains of caffeine in its natural condition in guarana,—if it be in its natural condition there,—is equivalent in effect to 3 grains of extracted and purified caffeine artificially prepared.

In abandoning this substance the writer proposes to substitute for it a fluid extract of green or unroasted coffee.

JAPANESE CAMPHOR—ITS PREPARATION, EXPERIMENTS AND ANALYSIS OF THE CAMPHOR OIL.*

BY H. OISHI.

(COMMUNICATED BY T. TAKAMATSA.)

Laurus camphora, or "kusunoki," as it is called in Japan, grows mainly in those provinces in the islands Shikoku and Kinshin, which have the southern sea coast. It also grows abundantly in the province of Kishu.

The amount of camphor varies according to the age of the tree. That of a hundred years old is tolerably rich in camphor. In order to extract the camphor, such a tree is selected; the trunk and large stems are cut into small pieces, and subjected to distillation with steam.

An iron boiler of 3 feet in diameter is placed over a small furnace, the boiler being provided with an iron flange at the top. Over this flange a wooden tub is placed, which is somewhat narrowed at the top, being 1 foot 6 inches in the upper, and 2 feet 10 inches in the lower diameter, and 4 feet in height. The tub has a false bottom for the passage of steam from the boiler beneath. The upper part of the tub is connected with a condensing apparatus by means of a wooden or bamboo pipe. The condenser is a flat rectangular wooden vessel, which is surrounded with another one containing cold water. Over the first is placed still another trough of the same dimensions, into which water is supplied to cool the vessel at the top. After the first trough has been filled with water, the latter flows into the next by means of a small pipe attached to it. In order to expose a large surface to the vapours, the condensing trough is fitted internally with a number of vertical partitions, which are open at alternate ends, so that the vapours may travel along the partitions in the trough from one end to the other. The boiler is filled with water, and 120 kilogrammes of chopped pieces of wood are introduced into the tub, which is then closed with a cover, cemented with clay, so as to make it air-tight. Firing is then begun; the steam passes into the tub, and thus carries the vapours of camphor and oil into the condenser, in which the camphor solidifies, and is mixed with the oil and condensed water. After twenty-four hours the charge is taken out from the tub, and new pieces of the wood are introduced, and distillation is conducted as before. The water in the boiler must be supplied from time to time. The exhausted wood is dried and used as fuel. The camphor and oil accumulated in the trough are taken out in five or ten days, and they are separated from each other by filtration. The yield of the camphor and oil varies greatly in different seasons. Thus much more solid camphor is obtained in winter than in summer, while the reverse in the case with the oil. In summer from 120 kilogrammes of the wood, 2·4 kilogrammes, or 2 per cent of the solid camphor are obtained in one day, whilst in winter, from the same amount of the wood, 3 kilogrammes, or 2·5 per cent of camphor are obtainable at the same time.

The amount of the oil obtained in ten days, *i.e.*, from 10 charges or 1200 kilogrammes of the wood, in summer is about 18 litres, while in winter it amounts only to 5–7 litres. The price of the solid camphor is at present about 1*s.* 1*d.* per kilo.

The oil contains a considerable amount of camphor in solution, which is separated by a simple distillation and cooling. By this means about 20 per cent. of the camphor can be obtained from the oil. The author subjected the original oil to fractional distillation, and examined different fractions separately. That part of the oil which distilled between 180°–185° C. was analysed after repeated distillations. The following is the result :—

	Found	Calculated as $C_{10}H_{16}O$.
C	= 78·87	78·95
H	= 10·73	10·52
O	= 10·40 (by difference)	10·52

The composition thus nearly agrees with that of the ordinary camphor.

The fraction between 178°-180° C., after three distillations, gave the following analytical result :—

C	=	86·95
H	=	12·28
		99·23

It appears from this result that the body is a hydrocarbon. The vapour density was then determined by V. Meyer's apparatus, and was found to be 5·7 (air = 1). The molecular weight of the compound is therefore $5·7 \times 14·42 \times 2 = 164·4$, which gives

$$H = \frac{164·4 \times 12·28}{100} = 20·18$$

or $C_{12}H_{20}$

$$C = \frac{164·4 \times 86·95}{100} = 11·81$$

Hence it is a hydrocarbon of the terpene series, having the general formula C_nH_{2n-4}. From the above experiments, it seems to be probable that the camphor oil is a complicated mixture, consisting of hydrocarbons of terpene series, oxyhydrocarbons isomeric with camphor, and other oxidized hydrocarbons.

Application of the Camphor Oil.

The distinguishing property of the camphor oil, that it dissolves many resins, and mixes with drying oils, finds its application for the preparation of varnish. The author has succeeded in preparing various varnishes with the camphor oil, mixed with different resins and oils. Lampblack was also prepared by the author, by subjecting the camphor oil to incomplete combustion, In this way from 100 c.c. of the oil, about 13 grams of soot of a good quality were obtained. Soot or lampblack is a very important material in Japan for making inks, paints, etc. If the manufacture of lampblack from the cheap camphor oil is conducted on a large scale, it would no doubt be profitable. The following is the report on the amount of the annual production of camphor in the province of Tosa up to 1880 :—

	Amount of Camphor produced.	Total Cost.
1877	504,000 kins	65,520 yen
1878	519,000 „	72,660 „
1879	292,890 „	74,481 „
1880	192,837 „	58,302 „

(1 yen = 2*s.* 9*d.*
1 kin = 1⅓lb.)

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The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE MEETING OF THE BRITISH ASSOCIATION IN CANADA.

DURING the present week the experiment of holding a meeting of the British Association outside the limits of the British Isles, which had been looked forward to by not a few of the members with somewhat lugubrious forebodings, has been tried, and, so far as can be judged by information at present at our disposal, has succeeded. There was never much doubt that the dwellers in Canada would strain every nerve to justify their enterprising invitation; but it was not quite so evident, when it was first accepted, that the contigent of British scientists who would be able or feel inclined to cross the Atlantic and take part in the meeting in Montreal would be sufficiently large to prevent at least the appearance of a fiasco. For some time past, however, the managers have been relieved from anxiety on this score, and already on last Saturday as many as five hundred visitors from this country had arrived in the Canadian city, amongst whom there was a very fair sprinkling of representative men. The Association meets this year under the presidency of Lord RAYLEIGH, and fortunately we have been enabled to print the address delivered by him to a crowded audience assembled in the Queen's Hall, on Wednesday evening, on another page of this Journal. It will be seen that Lord RAYLEIGH was somewhat more merciful to his audience than his predecessor, and that instead of cynically discussing before a mixed audience four dimensional space or the possibilities that, might attend the existence of curved planes, he contrived whilst providing food for thought for the profoundest student of Nature to introduce topics that could be grasped by the more superficially cultivated hearer. Being himself a professor of physics it was only natural that his thoughts should turn towards that branch of science, and the ground that he covered in attempting a record of recent progress in it quite justified his remark as to the enormous inclusiveness of the term. We do not think, especially as the address itself is available for reference and comes within moderate dimensions, that any useful purpose would be served by an attempt to summarize that portion of it which already partakes of the nature of a *précis*, but there are some general remarks towards the end which are worthy of an attention that they are perhaps likely to escape through their position.

Whilst evidently deeply impressed with the importance of a knowledge of facts, Lord RAYLEIGH utters a timely warning that in the present day, and in some departments, the accumulation of material of this kind is so rapid that there is great danger of indigestion, if indeed it does not already exist. He points out the great importance of the faculty of systematizing facts and drawing from a careful comparison of them inferences which, if not rising to the height of laws, will at least assist the memory that would otherwise be overburdened. But an essential preliminary is that the statements of facts shall be brought within reasonable reach of those who wish to study them, and that it shall not be assumed, by what Lord RAYLEIGH calls "a fiction as remarkable as any to be found in the law," that what has once been published, although it may have been in Russian, is therefore in the true sense of the word "known." Any person who is in the habit of turning over the scientific literature of a past generation will have frequently been impressed with the fact that after a time rediscovery in the laboratory is evidently more probable than recognition in the library. Moreover, it is difficult to see how, with the method of publication at present prevalent, the conditions can be altered. Take, for instance, the literature of chemistry, as that with which it may be assumed that our readers are to some extent familiar. What can be more bewildering than the higgledy-piggledy arrangement under which the multitudinous memoirs on chemical subjects usually see the light? Probably the great majority of these represent researches undertaken with specific objects and have a direct bearing upon and connection with others that have been previously published, or perhaps that may even appear in the same journal. But there is, as a rule, nothing to indicate this; the memoirs appear in juxtaposition with others upon widely separated subjects, and frequently they are presented under titles of such limited significance that the student of the general subject of which they form a part may consult quite fruitlessly the indexes in which they lie hidden. It is true that the difficulty is partly met in some of the foreign year-books, but only to a limited extent, though sufficiently perhaps to provoke the Utopian wish that the time may arrive when competent hands shall undertake the task of producing in our own language, at suitable intervals, comprehensive digests showing the significance of the work done.

Another subject was alluded to also by Lord RAYLEIGH that is of perennial interest, namely, the education of the future. Upon this subject it cannot be said that his prepossessions as a man of science appear to unduly bias his judgment, since he admits a doubt whether an exclusively scientific education would be satisfactory, and believes that

where there is plenty of time and literary aptitude Latin and Greek may make a good foundation. But the time; "ay, there's the rub!" Evidently, Lord RAYLEIGH is inclined to think that the amount of this article available in many instances is too limited to be used up in the acquirement of a partial knowledge of languages that may never be required after leaving school. Evidently, if the choice had to be made he would have the dead languages give place to living ones, together with mathematics and general science, and a better knowledge of English literature. His remarks on the first mentioned subject have so thoroughly our approval that we conclude by quoting them *verbatim*, although this may appear to be a repetition. He says: "I believe that French "and German, if properly taught, which I admit "they rarely are at present, would go far to replace "Latin and Greek from a disciplinary point of view, "while the actual value of the acquisition would, "in the majority of cases, be incomparably greater. "In halt the time usually devoted, without success, "to the classical languages, most boys could acquire "a really serviceable knowledge of French and "German."

In last week's Journal, by an unfortunate, but obvious, slip, the quantity of quinine sulphate sold recently at the Commercial Sale Rooms was given as 119 ounces, instead of 119,000 ounces. We may add that on Thursday last a further large quantity of sulphate of quinine, of the make of Zimmer of Frankfort, was offered for sale by public auction.

* * *

In addition to the petitions enumerated on pp. 68, 89 and 110, as having been presented to Parliament in respect to the provision in the late Medical Bill relating to Pharmacopœia revision, the Supplementary Report on Petitions just issued mentions one from the medical practitioners of Broomsgrove and Droitwich, with five signatures, and one from the pharmaceutical chemists and chemists and druggists of the same places, with five signatures, both presented by Mr. John Corbett, on the 30th of July.

* * *

The publication of the official report of the proceedings in the Section of Pharmacology and Therapeutics of the British Medical Association at Belfast reveals the fact that the discussion on the subject of the British Pharmacopœia took a wider scope than appeared from the more brief reports previously published, and that there were other resolutions passed besides the one to which we have already referred. Indeed this resolution appears to have really been passed in two parts, the first expressing the opinion that the present condition of the British Pharmacopœia is not satisfactory, and the second requesting the Council to take steps to ensure that the proposed new edition should be brought into more complete accord with the present state of medical knowledge. The latter part was moved by Dr. Whitla, of Dublin, who considered the former would be useless unless some steps were taken to ensure that the views of the committee should be represented on the revising committee. He expressed the opinion that it would be a most difficult performance to "force this standing grievance on the limited number of men (very good men, he did not doubt, but men who had no means of knowing to what extent certain drugs were used by the profession) who had the revision in hand." Nevertheless, he was of opinion that if there were some machinery by which the Pharmacopœia could be published piecemeal, so that the whole voice of the profession could be secured for the revision, "there would be a sweeping radical change, to which there could be no objection whatever, except that which might be raised by the small committee into whose hands the work had been entrusted."

* * *

The defence of the British Pharmacopœia was taken up by Dr. Walter Smith, of Dublin, who contended that in the main it is a very good work, and notably so if compared with the last edition of the French Codex, which he stigmatized as a "scandal to modern knowledge." Dr. Smith concluded by making two suggestions as likely to contribute greatly to the success of future editions of the British Pharmacopœia. The first was that the revision of it should take place periodically and not be left until the voice of the profession compelled the Medical Council to take it up. The second was to secure the co-operation of practical pharmacists in the revision, which, he said, would prevent many a glaring and ridiculous mistake. These views received a practical endorsement in a resolution that was subsequently passed unanimously, to the effect that the Section strongly urged the desirability of the revision of the Pharmacopœia at short intervals and of obtaining the active co-operation of skilled pharmacists in all future editions.

* * *

The *Lancet* commenting editorially upon this subject says that it is generally admitted that the British Pharmacopœia is an eminently unsatisfactory work that has been unhesitatingly condemned by the highest medical authorities in the country, and that it has repeatedly urged the necessity for placing that work on a more satisfactory footing. Our contemporary refers to the claim put forward by the President of the British Pharmaceutical Conference that pharmacists have a right to participate in the production of this work on the ground of their superior skill in the preparation of medicines, and says that this is a "view worthy of careful consideration, although of course a mere matter of detail." It adds, "what we want is a better Pharmacopœia, and if the Medical Council is unable or unwilling to accomplish the task in a reasonable time they must not be surprised if we look elsewhere for assistance."

* * *

The *Medical Times*, too, speaking of the "very able address" of Mr. Williams, says that his remarks on the compilation of the Pharmacopœia were perhaps not uncalled for. Our contemporary, without professing to be in the secrets of the Pharmacopœia Committee, does not suppose that that body is so inept as not to avail itself of the best expert advice it can command on purely pharmaceutical questions. If this be the case, then, it is argued, the question is one of sentiment, and no one in the medical profession would object to see pharmacists formally represented on the Pharmacopœia Committee. We confess that some succeeding sentences are rather more enigmatical, especially one in which the reader is informed that the more the medical profession advances the less importance will attach to such subjects as those which engaged the attention of the Pharmaceutical Conference.

British Pharmaceutical Conference.

TWENTY-FIRST ANNUAL MEETING.

(*Continued from page* 159.)

The next paper read was—

Further Contribution to the Pharmacy of Linseed.

BY THOMAS GREENISH, F.C.S., F.R.M.S.

In a former communication on this subject, read at the British Pharmaceutical Conference held in Edinburgh in 1871 (*Pharm. Journ.*, [3], ii., p. 211), attention was directed to farina lini as defined in the British Pharmacopœia, and to the character of the linseed meal at that time met with in many pharmacies.

There were exhibited on that occasion samples of linseed from the several countries on which this market was dependent for its supplies, with the view of showing not only the difference between the seed grown in a northern and that grown in a southern climate, but also the kind, character, and relative proportions of the weed seed, which were found to accompany more or less every sample of linseed, either as adulterants or the result of careless harvesting of the seed.

At the same time attention was specially directed to the presence of cruciferous seed, as, for instance, the wild mustard and the rape, among the weed seeds which accompanied in a greater or lesser proportion almost every sample of linseed that found its way into the English market, either for the production of linseed oil, linseed cake for fattening cattle, or the crushed linseed for pharmaceutical purposes. It was pointed out that these seeds being present, and in some samples to a considerable extent, there would be a consequent development of an acrid volatile oil, which must ensue on the addition of water in the formation of a poultice, the cataplasma lini, or any other of the cataplasms, in which linseed meal forms one of the ingredients.

For the sake of clearness it seems desirable to recapitulate, without needless repetition, some of the remarks made on that occasion. In the London Pharmacopœias of 1836 and 1851, sem. lini contrita, rendered "bruised linseed," was directed to be employed in making cataplasma lini and the other cataplasms into the composition of which linseed meal entered; but in the British Pharmacopœia of 1868 this article is headed "farina lini," translated "linseed meal," and described as "the cake of linseed from which the oil has been pressed, reduced to powder," and in the formula for the production of cataplasma lini olive oil is directed to be added in the proportion of half an ounce to four ounces of the meal.

In the paper to which reference has been made, farina lini, the produce of linseed lightly crushed, was strongly recommended as the best adapted for pharmaceutical requirements. But there were a few points which could not then be cleared up without the assistance of some one practically engaged in the crushing of linseed, as, for instance, the kind of seed best adapted for the production of farina lini; the amount of oil, if any, that should be removed by submitting the seed to pressure before or after its conversion into meal; and the quantity of husk, if any, that should be sifted out and separated from the linseed meal, so that a farina lini may be produced the most suitable for the requirements of the Pharmacopœia, in the best condition for keeping, and in every respect abreast of the advancement of pharmacy. If apology were needed for again referring to this subject it will be sufficient to state that the pharmacy of linseed is in an incomplete state, and that an article of the materia medica, which has a place in five preparations of the British Pharmacopœia, is admitted by pharmacists to be capable of improvement, and it must be accepted as most desirable that the description of the product in the National Pharmacopœia should correspond with the method generally recognized as the best for the production of a farina lini capable of fulfilling all the requirements of the Pharmacopœia.

It may be as well at this stage of the inquiry to pass in review the several kinds of linseed meal as usually met with in commerce; this course will afford the opportunity of discussing the merits or demerits of each and their applicability to the requirements of an official preparation. The samples on the table will serve as illustrations.

The source of the present official preparation is the cake of linseed, from which the oil has been pressed, reduced to powder. The linseed cake of commerce is the result of the pressure of the seed either for the sake of the oil employed in the arts or for the cake used in fattening cattle. The farini lini from this source is therefore a bye-product; and without again entering upon a question, referred to in the former paper, as to the extent to which contaminated seed may have been used in the commercial production of the cake, although it has an important bearing on the present question, I hold it as very undesirable that the linseed meal of the Pharmacopœia should be a secondary product.

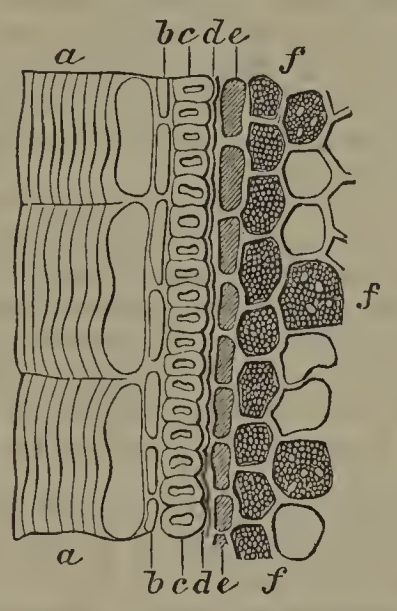

Fig. 1. Tranverse section of Linseed.
(After Vogl.)

a. Epidermal cells. *b*. Layer of elongated cells. *c*. Fibrous cell layer. *d*. Layer of thin cells. *e*. Layer of pigment cells. *f*. Cell tissue, with the farina and globules of oil.

When pressure is exercised on the seed, as in the manufacture of the cake, the oil, represented by the globules observed in the drawing, passes through the farina on its way to the surface for collection, and must necessarily saturate with oil the whole mass, so that the extent of oily surface exposed to atmospheric influence and the liability to oxidation must be enormously increased; for this reason alone grave objections must always apply to the cake as a source of the farina lini. Besides, the most contaminated seed may have been used in the manufacture of the cake, needing only the addition of water for the development of an acrid volatile oil never contemplated in the formula for making the linseed cataplasm.

In the first instance the natural oil is removed from its own cells in the seed and its oxidation consequently promoted, and then about the same percentage of olive oil is directed to be added in making the poultice. Of course it is possible to employ a pure cake in the manufacture of the meal, but even with that condition the very strongest objections apply to the process of its manufacture, which I have just commented on. The farina lini from this source and corresponding with the instructions of the British Pharmacopœia is a dry meal and represented by sample No. 1.

There are here two samples of light crushed linseed; in neither of them has the seed been subjected to any process beyond that of being lightly crushed. No. 2 represents the crushed linseed as it falls from the rollers. No. 3 the same, with about 20 per cent. removed, as husk, in order

to make the article approximate more closely to the term meal. In both of these samples, Nos. 2 and 3, there has been the smallest possible disturbance of the oil from its natural position in the several cells. From No. 2 about 20 per cent. has been removed as husk, as represented in No. 3; this is known as the best light crushed linseed.

From what I have stated my conclusions will have been anticipated that serious objections apply to any linseed cake as a source of the officinal farina lini, and that a linseed rich in farina, with the smallest possible amount of weed seed, and Bombay linseed as a rule fulfils these requirements, lightly crushed between iron rollers without the removal of any oil, should be the source of the farina lini of the Pharmacopœia. The removal of about 20 per cent. as husk makes it approximate more closely to a meal and is in no way detrimental to its future employment in the several Pharmacopœia cataplasms.

In being lightly crushed, the oil in its natural cells is scarcely at all disturbed, and therefore, but slightly exposed to oxidation from atmospheric influences. The product contains the whole of the oil, averaging from 30 per cent. to 33 per cent., originally present in the seed.

This farina is not a secondary product but prepared especially for the requirements of the pharmacist. It will keep good for several months, which may be considered a reasonable length of time, under the ordinary conditions of storage in a pharmacy.

Sample No. 4 is the light crushed linseed as represented in No. 2 without the removal of any portion of the husk; but after being crushed it is subjected to the action of edge-runners, which by their pressure distribute the oil throughout the entire mass. The result is a greasy meal, inelegant, with an increased liability to oxidation due to that part of the process which has reference to the edge-runners. This substance is not suited for general use in pharmacy.

I have stated that preference is given to the sample of crushed linseed No. 3, and that it is known by the term "best light crushed linseed." It is No. 2 with about 20 per cent. removed as husk. The question may be asked here, If the removal of 20 per cent. be an improvement, in that the result more nearly represents a true meal, why not take out the whole of the husk so as to make farina lini approximate to farina tritici?

In detailing the result of some experiments on this subject it will be seen that although 20 per cent. of husk may be removed with advantage to its appearance and no disadvantage to its employment for cataplasms, yet the entire husk could not be removed without the loss of a quality that seems very desirable in a poultice.

It will be necessary here to refer to some curious points in the economy of plant life for an explanation of my reasons for this conclusion. Referring again to the drawing Fig. 1, a transverse section of linseed, the epidermal cells (*a*) are observed, in which, in contact with water, vegetable mucilage is formed and exudes yielding a gummy solution familiar to the pharmacist in the preparation of infusion of linseed. If a cataplasm be made of No. 3 sample of farina, or, which is the same thing No. 2, with about 20 per cent. of husk removed, a plastic cataplasm is the result; but if the greater part of the husk be removed, sufficient vegetable mucilage, which proceeds from the husk, is not formed to give the poultice a plastic character, and the result is a semi-liquid paste rather than a poultice, which will not hold its place when applied, being deprived of that adhesive property given to it by the vegetable mucilage. This vegetable mucilage is due to a transformation of cellular tissue into other substances, a change which frequently occurs in plant life, some of our gums being thus produced. Somewhat similar in its nature to the formation of gum is the conversion into mucilage of the epidermal cells of many seeds, as in that now under consideration, the linseed; also the quince, fleabane, and mustard seed. When placed in water the cell wall becomes excessively thickened, the innermost layers swell, burst the outer layers and discharge a transparent substance called vegetable mucilage, differing in its character from that which is known to the pharmacist as mucilage, in that it is not precipitated on the addition of spirit, and differing also from albumen in not being coagulated by heat; neither is it a secretion of the cell. This change may be observed in placing a thin transverse section of linseed under a cover-glass With spirit as a medium, no change takes place; but on the addition of water, the separation of laminæ, less formal than that indicated in the drawing, with the formation of the mucilage, will be gradually developed.

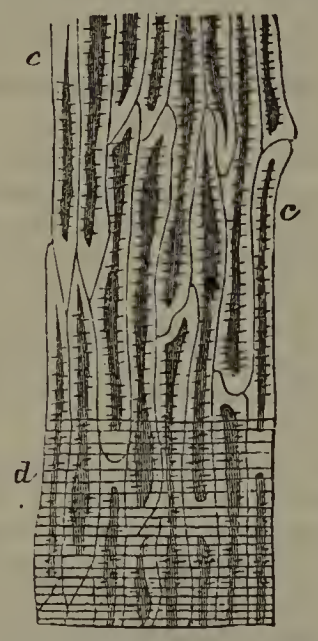

Fig. 2.—Typical combination of cells characterizing the linseed husk, corresponding with the letters on Fig 1. After Vogl.

The second drawing, Fig. 2, has no reference to this paper, but is a longitudinal section showing the typical cell tissue, *c* and *d* in the drawing, Fig. 1, by which linseed is detected under the microscope when it occurs as an adulterant, or in some combination where it should have no place.

Another question of some importance will also suggest itself, How should the linseed meal of the future be described in the Pharmacopœia? The definition should be somewhat broad or the pharmacist may be harassed by the public analyst. Probably a return to the term *sem. lini contrita* of the Pharmacopæias of 1836 and 1851, and the description "crushed linseed," would be sufficiently definite, leaving the elegance of the preparation to the discretion of the pharmacist. The dry and generally impure linseed meal, the produce of the cake deprived of its oil and ground to powder, will still be kept by the wholesale dealer for the supply at a cheaper rate of the wants of a poor neighbourhood, and as a material for luting the steam apparatus of the pharmacist, for which the crushed linseed is not adapted; but the pharmacist owes it to his calling to bring his educated intelligence and his practical knowledge to bear on the improvement of any preparation between the issue of successive Pharmacopœias, so that each succeeding one may fully represent progressive pharmacy.

I am indebted to the firm of Sadler, Firth and Ross, seed crushers, Great Guildford Street, Southwark, for much practical information, for their courtesy in allowing me to see the crushing mills in operation, and also for the samples I have the pleasure of exhibiting in illustration of this paper.

A vote of thanks having been passed to Mr. Greenish,

Professor REDWOOD said he did not at all object to the general purport of Mr. Greenish's recommendation with reference to linseed meal. Formerly he was opposed to the recognition of crushed linseed in the Pharmacopœia as linseed meal, and he still was not prepared to admit that the term used in the London Pharmacopœia, *semina lini contrita* signified crushed linseed. The word *contrita* was translated by Mr. Phillips,

the author of the Pharmacopœia, as powdered linseed; whilst at the time the Pharmacopœia was published, in 1836 and 1851, crushed linseed was certainly not in common use amongst pharmacists, and at the earlier date he was not sure it was ever met with. At any rate he knew that in some of the first establishments in London such a thing was never used, or recognized in any way as linseed meal. He considered, therefore, that what was intended in the London Pharmacopœia was the article in common use, viz., linseed which had first been crushed, and the oil extracted, and then the cake reduced to a powder. At the time when the British Pharmacopœia was being drawn up, he was under the impression, derived from his own observations and corroborated by what he had learned from others, that the crushed linseed which was then coming into use as the basis of poultices, was not approved by all who used it, especially that it was liable to become mouldy when kept in a closed vessel, and that on that account, many gave the preference to the older preparation. The authors of the British Pharmacopœia were of opinion that the older preparation, if used with a small portion of oil, was preferable to the newer kind of crushed linseed containing its own oil. Since then, seeing that crushed linseed had largely superseded the older preparation he had come to the conclusion that it would be wise to recognize it. But still there were certain considerations which had to be borne in mind. Allusion had been made to the effect that linseed was very liable to adulteration, especially by cruciferous seeds, which yielded an irritating product when made into a paste with water, and which required to be specially guarded against. But was there not more liability to this contamination in crushed linseed prepared especially for pharmaceutical purposes than in the powder produced from seed from which the oil had been removed? Mr. Greenish, he saw, shook his head, but he would throw out a few points for consideration. It was well known that for many years there had been considerable difficulty in obtaining pure linseed oil, and this was a serious complaint with painters, because the seeds from which the oil was extracted contained foreign seeds yielding oil which had not the same drying properties as pure linseed oil possessed. The consequence had been that oil merchants and oil pressers had resorted to the most stringent means for excluding all linseed containing these cruciferous seeds, and a society had been formed in London, and maintained at a large cost, the secretary having a salary £800 or £1000 a year, and having a large establishment under him, and all linseed to be used for oil pressing was now subjected to the most careful scrutiny, especially as to the proportion of foreign seeds it contained. He took it therefore that the oil now produced for painters was made from the purest possible seed. But it would require great care and very nice observation on the part of pharmacists to guard against the use of inferior seeds which had not been passed by the Linseed Association of London, where they were all microscopically examined; and which inferior seeds would be very likely to be crushed for pharmaceutical use. It would be looked upon, commercially and economically, much more important to importers and dealers on a large scale to be able to supply seed which would yield an oil which was above suspicion, than to supply a good article for pharmacy; therefore, although he had come to the conclusion that crushed linseed must be recognized, he wanted to see some means of excluding from it those inferior seeds which were not fit to be used in pharmacy any more than for the extraction of oil.

Mr. Wrenn said he was much interested in this subject and had thought of introducing it himself. Having occasion to apply for a quotation for linseed cake for the production of linseed meal, he found the dealer would not guarantee its purity, saying if pure cake were required it would have to be specially prepared. The first thing requisite was to get rid of the round irritating seeds, which were principally cruciferous. Now, in aramble in Hertfordshire, he had come across an agricultural implement manufacturer, who was just introducing to farmers a machine for the separation of round seeds from wheat and oats, which consisted of a long cylinder revolving at an angle of 15° to 20° and having a number of holes perforated in it, through which the round seeds escaped, whilst the wheat and oats fell to the end. It struck him that a small machine of similar construction might very well be employed by pharmacists for clearing linseed, and they could then, with a small mill, crush their own linseed as it was required.

Mr. Borland thought Mr. Greenish had failed to show any reason for removing 20 per cent. of the husk, which must at the same time remove a large percentage of the mucilaginous cells. If the 80 per cent. of husk allowed to remain were an advantage, why should the 20 per cent. be removed? He would also direct attention to other adulterants which were found in linseed meal. A short time ago a sample was submitted to him for examination which contained undoubtedly cereal grains, and by the ordinary iodine test starch granules were immediately detected. On referring to some works on the subject, he was astonished to find that linseed, as sometimes met with, which had been collected when the seeds were unripe, contained a considerable quantity of starch, but when thoroughly ripe they contained no starch at all. This, therefore, was a ready means of ascertaining whether the linseed had been collected at the proper time, and showed again the importance of a knowledge of physiological botany.

Mr. Frazer said his house had sold nothing but pure crushed linseed since 1838; no complaint had been received from any customer, whilst a higher price had been obtained for it than was given for the ordinary linseed meal. There was no difficulty in getting good seed if you gave a good price.

Mr. Holmes said he had had the opportunity of examining a large number of samples of linseed, and had also visited the establishment of the Linseed Association, and his experience agreed with Mr. Frazer's that anyone who would pay the price could always get perfectly pure linseed, but if not, it could be got of any quality required. There were three varieties in commerce which were generally tolerably pure, the English, the Dutch and the Sicilian. The English and Dutch were both small and dark; the Sicilian was rather large. Mr. Greenish recommended the Bombay, the specimen shown being rather a large seed, and he should like to ask him whether he recommended large or small seed as best suited for pharmaceutical purposes. Bombay being a large emporium of drugs, in the East, the varieties which came there would be of all kinds. The specimen shown was a very good sample, but he had seen Bombay linseed which contained more cruciferous seeds even than the Russian. With referrence to Professor Redwood's remarks, no doubt the pure linseed cake could be got if a good price were paid; but as a matter of fact, that used in feeding cattle was often exceedingly impure, as could be seen from reports in the *Live Stock Journal* and other papers, and he did not see how they were to ensure getting that cake only from which the best oil had been extracted, as Professor Redwood suggested. It seemed to him the best way was for every pharmacist to get the best linseed he could and grind it himself.

Mr. Bottle said he went a long way with Mr. Greenish in preferring crushed linseed to the old linseed meal, but he did not agree with him as to taking out 20 per cent. of the husk, as a large quantity of mucilage would thereby be lost. He was old enough to remember the time when there was no difficulty in getting pure linseed meal or pure linseed oil, even before the days of machinery for separating cruciferous seeds. The linseed was grown in good condition, and the oil was produced in fairly good condition; then unfortunately the oil was wanted at a lower price, and adulterants were introduced into the seed, and the cake partook of the adulteration, and so a very im-

perfect material for a poultice resulted. He had for many years kept crushed linseeed and did not find it go bad. If the seed were in good condition when crushed, it kept very well, quite as well as the old dry powder. At the same time if a good price were paid he believed a cake could be procured which would yield pure linseed powder; the only difficulty was in giving the price for it, and knowing you were dealing with respectable people. In Kent a great many farmers were in the habit of crushing their own linseed, because they could not buy cake which yielded satisfactory results; and he got his crushed linseed from a large farmer, a friend of his, who had a crushing mill. He had inspected the seed, and found that no special process was adopted, or needed, for removing impurities. It certainly did not contain 2½ per cent. of anything like that amount of impurity; here and there you might find a cruciferous seed, which might be removed if necessary by the process that had been mentioned, and was now largely used for cleaning foreign wheats.

Mr. ATKINS said it was interesting to notice the progress which had taken place in connection with this subject since Mr. Greenish read a paper upon it at the Edinburgh meeting thirteen years ago. In the benighted south they were not then so far advanced as in Glasgow, where Mr. Frazer, it appeared, had always been using crushed seed. At that date they were then largely using the powdered cake, though the meal with the oil in it was gradually coming into use, and in his own district it had now entirely superseded the dry meal. He understood that Professor Redwood rather favoured the plan of selected pure cake, powdering it, and then adding oil; but the method put forward in the paper seemed to him preferable, of selecting a pure seed, crushing it, and retaining the oil. There might be care taken in selecting seed for crushing in London, but he should like to know if the same test were applied in Hull, which was one of the largest markets in the kingdom. No doubt linseed oil was an important article, but he doubted if the cake were not of quite equal importance in a commercial point of view.

Mr. CLARK said there was no difficulty in getting pure seed or pure meal, and as to cake, there had never been a time when such a large proportion of pure cake was sold. Many houses would send out a written guarantee with it, that it was pure, according to Dr. Voelcker's analysis. The facilities for cleaning seeds were not very great, and he had seen samples much better than the one Mr. Greenish had shown. The same thing applied to oil; there was no difficulty in getting pure linseed oil if you would pay for it, but if you only paid a second class price you could not expect a first class article. He was told by varnish makers that there was not the same difficulty there was some years ago in obtaining genuine linseed oil. Wholesale dealers would supply crushed linseed from seed, a sample of which they would send, and guarantee it, and at such a price that he thought it useless for chemists to think of crushing it themselves. They used to do so, but they could now obtain it ready crushed more cheaply, and, he believed, equal in quality.

Mr. HASSELBY said he knew something of this matter, as he came from the neighbourhood of Hull. He had had linseed in stock similar to sample No. 4, and found it did not keep well; it turned sour; the patients did not like it, and the medical men complained. At one time they used ordinary linseed meal and mixed oil with it, and during his apprenticeship it had a great sale; but it had now gone entirely out of use, because medical men had an idea that crushed linseed with the oil in was the best, and they impressed on their patients that they must get it. Pure crushed linseed could be bought by paying the price, but in many places chemists had to compete with grocers who knew nothing about cruciferous seeds, and never cared to examine the quality of the linseed meal they sold. There was no doubt the linseed should be clean. One question was, where did all the English linseed go to. He thought it was largely used by the farmers and squires, who found that if their cattle had pure linseed cake they yielded more milk, and it was free from all unpleasant taste. He agreed with Professor Redwood that if you bought linseed cake which had already had the oil extracted from it, it had probably passed a certain standard, and must be, to a certain extent, pure; but then there was the difficulty that medical men now preferred the crushed linseed with the oil in. This point must, of course, be decided by the medical men themselves. Did it retain the heat longer and was it more beneficial? He was inclined to think that the old lini farina did very well, and was as useful in the cure of boils and carbuncles as the modern crushed linseed; but there was another article which was now pushing it out of the market, powdered slippery elm bark, which, after a deal of hesitation, and after using crushed linseed in vain, he had himself found very efficacious in the cure of a carbuncle. There was a lot of whitish linseed in the market, which he should like to know more about; he fancied it was Persian.

Mr. HOLMES said it was Indian.

Mr. HASSELBY said he had lately had some of this light linseed, which his customers seemed to like better than the dark. Having inquired of a dealer if he could supply it, he said he thought he could, and he had a hundredweight to try; it looked very nice, but when he came to examine it he found a certain percentage of crushed horse beans, the white flour of which made the sample look very nice. He thought it would be well if the students at the Square were more instructed in the use of the microscope for the detection of such adulteration, and that a few articles in the Journal on such matters would be of great advantage to the trade.

Mr. MARTINDALE said his father, who was a farmer, used to grow linseed, but he kept it for home use. He was under the impression that the large seed, which mostly came to Hull, was Russian seed, and it was a very pure seed until the time of the Russian war, when owing to the closing of the Russian parts, they had to look to India for it. The Indian seed being very prolific got mixed with cruciferous seeds, and hence it was not so pure as it used to be.

Mr. GREENISH said that was about the truth as regarded Russian seed, but the seeds from Bombay and Sicily were, as a rule, very free from any weed seed.

Mr. MARTINDALE continued, that in most London hospitals the powdered cake was used, and in particular one of the surgeons of the Marylebone Dispensary, on the committee of which he was, insisted on his patients having the powdered cake, and would not have the crushed linseed. He generally supplied crushed linseed himself, because the public preferred it, but as to the comparative merits of the two he was in some doubt. In his younger days nothing but the powdered cake was used; then one or two West-end chemists introduced the crushed linseed as a novelty, but he had his doubts as to its real superiority. In his opinion it was the mucilage and the hot application which was beneficial. He thought the demand of the farmers for cake was quite equal to that of painters for the oil.

Mr. FARNWORTH (Blackburn) said he had had some experience in this substance, and he found the only satisfactory article was English or Irish linseed. With reference to the drying properties of linseed oil he found from consulting oil merchants and manufacturers that the Baltic seed made the best drying oil. In Liverpool where Sicilian, Italian and Indian seed was much used, a much lighter coloured oil was produced, which could be used for grinding up with white lead, but it did not dry so well. The ground linseed he got was very satisfactory, and his customers liked it very well. It was English linseed crushed between stones, and much resembled Mr. Greenish's sample.

The PRESIDENT said this was a very interesting and practical subject, which always elicited a good deal of discussion. The old-fashioned way of testing linseed was

to chew it; if it was gritty it had sand in it, and if it stung the tongue it had some other seeds mixed; but that was only a rough test which was not considered scientific enough for the present day.

Mr. GREENISH, in reply, said his main object had been to point out the necessity of including crushed linseed in a future pharmacopœia. He thought the term *sem. lini contrita* would do for it very well, without reference to what it might have meant in the old Pharmacopœia. Professor Redwood had stated that it was very difficult to get good linseed oil, on account of the presence of these cruciferous seed, and necessarily the same seeds must be found in the cake. He objected *in toto* to using cake, even when manufactured for the express purpose, in the formation of linseed meal; it was more consistent with pharmacy to have a linseed meal made specially for the purpose. He had taken a casual sample, not picked, of Bombay linseed to illustrate the very small amount of adulteration or admixture; there could not be more than 2 or 3 per cent. in it. On the other hand, he had specimens of linseed from northern climates which contained an enormous quantity of other seeds, and he thought the use in pharmacy of cake from which the oil had been pressed for other purposes was not worthy of pharmacists of the present day. There was much less difficulty in taking away small foreign seeds from the large Bombay linseed than from the smaller varieties. It also yielded a much larger quantity of farina in proportion than the small seeds from northern climates, which came from the Baltic ports. Mr. Borland had objected to 20 per cent. of husk being removed, but his idea was that so long as there was that amount of husk left which would give a gelatinous poultice there was quite enough. A poultice made from such a material would remain the same size, and on the place where it was put, whereas without any husk at all it would run, almost like mustard. He had worked at this subject for a long time, and he could say from a very extended course of observation that crushed linseed was remarkably free from any adulteration whatever. His opinion, which was in accordance with that expressed by Mr. Hanbury eleven years ago, was that this was the best article to keep, and the one which every chemist ought to keep, although he might also have the powder for those who wanted a linseed meal at a lower price. In reply to a further question, Mr. Greenish said that he removed 20 per cent. of the husk because it made the crushed linseed look more like linseed meal, and did not at all interfere with the gelatinous character of the poultice.

(*To be continued.*)

The British Association for the Advancement of Science.

FIFTY-THIRD ANNUAL MEETING.

The fifty-third annual meeting of the above Association commenced on Wednesday, August 27, in the Queen's Hall, at Montreal, under the Presidency of the Right Hon. Lord Rayleigh, M.A., D.C.L., F.R.S., F.R.A.S., F.R.G.S., Professor of Experimental Physics in the University of Cambridge.

THE PRESIDENT'S ADDRESS.

It is no ordinary meeting of the British Association which I have now the honour of addressing. For more than fifty years the Association has held its autumn gathering in various towns of the United Kingdom, and within those limits there is, I suppose, no place of importance which we have not visited. And now, not satisfied with past successes, we are seeking new worlds to conquer. When it was first proposed to visit Canada, there were some who viewed the project with hesitation. For my own part, I never quite understood the grounds of their apprehension. Perhaps they feared the thin edge of the wedge. When once the principle was admitted, there was no knowing to what it might lead. So rapid is the development of the British Empire, that the time might come when a visit to such out-of-the-way places as London or Manchester could no longer be claimed as a right, but only asked for as a concession to the susceptibilities of the English. But seriously, whatever objections may have at first been felt were soon outweighed by the consideration of the magnificent opportunities which your hospitality affords of extending the sphere of our influence and of becoming acquainted with a part of the Queen's dominion which, associated with splendid memories of the past, is advancing daily by leaps and bounds to a position of importance such as not long ago was scarcely dreamed of. For myself, I am not a stranger to your shores. I remember well the impression made upon me, seventeen years ago, by the wild rapids of the St. Lawrence, and the gloomy grandeur of the Saguenay. If anything impressed me more, it was the kindness with which I was received by yourselves, and which I doubt not will be again extended not merely to myself but to all the English members of the Association. I am confident that those who have made up their minds to cross the ocean will not repent their decision, and that, apart altogether from scientific interests, great advantage may be expected from this visit. We Englishmen ought to know more than we do of matters relating to the Colonies, and anything which tends to bring the various parts of the Empire into closer contact can hardly be overvalued. It is pleasant to think that this Association is the means of furthering an object which should be dear to the hearts of all of us; and I venture to say that a large proportion of the visitors to this country will be astonished by what they see, and will carry home an impression which time will not readily efface.

To be connected with this meeting is, to me, a great honour, but also a great responsibily. In one respect, especially, I feel that the Association might have done well to choose another President. My own tastes have led me to study mathematics and physics rather than geology and biology, to which naturally more attention turns in a new country, presenting as it does a fresh field for investigation. A chronicle of achievements in these departments by workers from among yourselves would have been suitable to the occasion, but could not come from me. If you would have preferred a different subject for this address, I hope, at least, that you will not hold me entirely responsible.

At annual gatherings like ours the pleasure with which friends meet friends again is sadly marred by the absence of those who can never more take their part in our proceedings. Last year my predecessor in this office had to lament the untimely loss of Spottiswoode and Henry Smith, dear friends of many of us, and prominent members of our Association. And now, again, a well-known form is missing. For many years Sir W. Siemens has been a regular attendant at our meetings, and to few indeed have they been more indebted for success. Whatever the occasion, in his Presidential Address of two years ago, or in communications to the Physical and Mechanical Sections, he had always new and interesting ideas, put forward in language which a child could understand, so great a master was he of the art of lucid statement in his adopted tongue. Practice with Science was his motto. Deeply engaged in industry, and conversant, all his life, with engineering operations, his opinion was never that of a mere theorist. On the other hand, he abhorred rule of thumb, striving always to master the scientific principles which underlie rational design and invention.

It is not necessary that I should review in detail the work of Siemens. The part which he took, during recent years, in the development of the dynamo machine must be known to many of you. We owe to him the practical adoption of the method, first suggested by

Wheatstone, of throwing into a shunt the coils of the field magnets, by which a greatly improved steadiness of action is obtained. The same characteristics are observable throughout—a definite object in view and a well-directed perseverance in overcoming the difficulties by which the path is usually obstructed.

These are, indeed, the condidions of successful invention. The world knows little of such things, and regards the new machine or the new method as the immediate outcome of a happy idea. Probably, if the truth were known, we should see that, in nine cases out of ten, success depends as much upon good judgment and perseverance as upon fertility of imagination. The labours of our great inventors are not unappreciated, but I doubt whether we adequately realize the enormous obligations under which we lie. It is no exaggeration to say that the life of such a man as Siemens is spent in the public service; the advantages which he reaps for himself being as nothing in comparison with those which he confers upon the community at large.

As an example of this it will be sufficient to mention one of the most valuable achievements of his active life—his introduction, in conjunction with his brother, of the regenerative gas furnace, by which an immense economy of fuel (estimated at millions of tons annually) has been effected in the manufacture of steel and glass. The nature of this economy is easily explained. Whatever may be the work to be done by the burning of fuel, a certain *temperature* is necessary. For example, no amount of heat in the form of boiling water would be of any avail for the fusion of steel. When the products of combustion are cooled down to the point in question, the heat which they still contain is useless as regards the purpose in view. The importance of this consideration depends entirely upon the working temperature. If the object be the evaporation of water or the warming of a house, almost all the heat may be extracted from the fuel without special arrangements. But it is otherwise when the temperature required is not much below that of combustion itself, for then the escaping gases carry away with them the larger part of the whole heat developed. It was to meet this difficulty that the regenerative furnace was devised. The products of combustion, before dismissal into the chimney, are caused to pass through piles of loosely stacked fire-brick, to which they give up their heat. After a time the fire-brick, upon which the gases first impinge, becomes nearly as hot as the furnace itself. By suitable valves the burnt gases are then diverted through another stack of brickwork which they heat up in like manner, while the heat stored up in the first stack is utilized to warm the unburnt gas and air on their way to the furnace. In this way almost all the heat developed at a high temperature during the combustion is made available for the work in hand.

As it is now several years since your presidential chair has been occupied by a professed physicist, it may naturally be expected that I should attempt some record of recent progress in that branch of science, if indeed such a term be applicable. For it is one of the difficulties of the task that subjects as distinct as Mechanics, Electricity, Heat, Optics and Acoustics, to say nothing of Astronomy and Meteorology, are included under Physics. Any one of these may well occupy the life-long attention of a man of science, and to be thoroughly conversant with all of them is more than can be expected of any one individual, and is probably incompatible with the devotion of much time and energy to the actual advancement of knowledge. Not that I would complain of the association sanctioned by common parlance. A sound knowledge of at least the principles of general physics is necessary to the cultivation of any department. The predominance of the sense of sight as the medium of communication with the outer world, brings with it dependence upon the science of optics; and there is hardly a branch of science in which the effects of *temperature* have not (often without much success) to be reckoned with. Besides, the neglected borderland between two branches of knowledge is often that which best repays cultivation, or, to use a metaphor of Maxwell's, the greatest benefits may be derived from a cross fertilization of the sciences. The wealth of material is an evil only from the point of view of one of whom too much may be expected. Another difficulty incident to the task, which may be faced but cannot be overcome, is that of estimating rightly the value, and even the correctness, of recent work. It is not always that which seems at first the most important that proves in the end to be so. The history of science teems with examples of discoveries which attracted little notice at the time, but afterwards have taken root downwards and borne much fruit upwards

One of the most striking advances of recent years is in the production and application of electricity upon a large scale—a subject to which I have already had occasion to allude in connection with the work of Sir W. Siemens. The dynamo machine is indeed founded upon discoveries of Faraday now more than half a century old; but it has required the protracted labours of many inventors to bring it to its present high degree of efficiency. Looking back at the matter, it seems strange that progress should have been so slow. I do not refer to details of design, the elaboration of which must always, I suppose, require the experience of actual work to indicate what parts are structurally weaker than they should be, or are exposed to undue wear and tear. But with regard to the main features of the problem, it would almost seem as if the difficulty lay in want of faith. Long ago it was recognized that electricity derived from chemical action is (on a large scale) too expensive a source of mechanical power, notwithstanding the fact that (as proved by Joule in 1846) the conversion of electrical into mechanical work can be effected with great economy. From this it is an evident consequence that electricity may advantageously be obtained from mechanical power; and one cannot help thinking that if the fact had been borne steadily in mind, the development of the dynamo might have been much more rapid. But discoveries and inventions are apt to appear obvious when regarded from the standpoint of accomplished fact; and I draw attention to the matter only to point the moral that we do well to push the attack persistently when we can be sure beforehand that the obstacles to be overcome are only difficulties of contrivance, and that we are not vainly fighting unawares against a law of nature.

The present development of electricity on a large scale depends, however, almost as much upon the incandescent lamp as upon the dynamo. The success of these lamps demands a very perfect vacuum,—not more than about one-millionth of the normal quantity of air should remain,—and it is interesting to recall that, twenty years ago, such vacua were rare even in the laboratory of the physicist. It is pretty safe to say that these wonderful results would never have been accomplished had practical applications alone been in view. The way was prepared by an army of scientific men whose main object was the advancement of knowledge, and who could scarcely have imagined that the processes which they elaborated would soon be in use on a commercial scale and entrusted to the hands of ordinary workmen.

When I speak in hopeful language of practical electricity, I do not forget the disappointment within the last year or two of many over-sanguine expectations. The enthusiasm of the inventor and promoter are necessary to progress, and it seems to be almost a law of nature that it should overpass the bounds marked out by reason and experience. What is most to be regretted is the advantage taken by speculators of the often uninstructed interest felt by the public in novel schemes by which its imagination is fired. But looking forward to the future of electric lighting, we have good ground for encouragement. Already the lighting of large passenger ships is an assured success, and one which will be highly appreciated by those travellers who have experienced the

tedium of long winter evenings unrelieved by adequate illumination. Here, no doubt, the conditions are in many respects especially favourable. As regards space, life on board ship is highly concentrated; while unity of management and the presence on the spot of skilled engineers obviate some of the difficulties that are met with under other circumstances. At present we have no experience of a house-to-house system of illumination on a great scale and in competition with cheap gas; but preparations are already far advanced for trial on an adequate scale in London. In large institutions, such as theatres and factories, we all know that electricity is in successful and daily extending operation.

When the necessary power can be obtained from the fall of water, instead of from the combustion of coal, the conditions of the problem are far more favourable. Possibly the severity of your winters may prove an obstacle, but it is impossible to regard your splendid river without the thought arising that the day may come when the vast powers now running to waste shall be bent into your service. Such a project demands of course the most careful consideration, but it is one worthy of an intelligent and enterprising community.

The requirements of practice react in the most healthy manner upon scientific electricity. Just as in former days the science received a stimulus from the application to telegraphy, under which everything relating to measurement on a small scale acquired an importance and development for which we might otherwise have had long to wait, so now the requirements of electric lighting are giving rise to a new development of the art of measurement upon a large scale, which cannot fail to prove of scientific as well as practical importance. Mere change of scale may not at first appear a very important matter, but it is surprising how much modification it entails in the instruments, and in the processes of measurement. For instance, the resistance coils on which the electrician relies in dealing with currents whose maximum is a fraction of an ampere, fail altogether when it becomes a question of hundreds, not to say thousands, of amperes.

The powerful currents, which are now at command, constitute almost a new weapon in the hands of the physicist. Effects, which in old days were rare and difficult of observation, may now be produced at will on the most conspicuous scale. Consider for a moment Faraday's great discovery of the "Magnetization of Light," which Tyndall likens to the Weisshorn among mountains, as high, beautiful, and alone. This judgment (in which I fully concur) relates to the scientific aspect of the discovery, for to the eye of sense nothing could have been more insignificant. It is even possible that it might have eluded altogether the penetration of Faraday, had he not been provided with a special quality of very heavy glass. At the present day these effects may be produced upon a scale that would have delighted their discoverer, a rotation of the plane of polarization through 180° being perfectly feasible. With the aid of modern appliances, Kundt and Röntgen in Germany, and H. Becquerel in France, have detected the rotation in gases and vapours, where, on account of its extreme smallness, it had previously escaped notice.

Again, the question of the magnetic saturation of iron has now an importance entirely beyond what it possessed at the time of Joule's early observations. Then it required special arrangements purposely contrived to bring it into prominence. Now in every dynamo machine, the iron of the field-magnets approaches a state of saturation, and the very elements of an explanation of the action require us to take the fact into account. It is indeed probable that a better knowledge of this subject might lead to improvements in the design of these machines.

Notwithstanding the important work of Rowland and Stoletow, the whole theory of the behaviour of soft iron under varying magnetic conditions is still somewhat obscure. Much may be hoped from the induction balance of Hughes, by which the marvellous powers of the telephone are applied to the discrimination of the properties of metals, as regards magnetism and electric conductivity.

The introduction of powerful alternate-current in machines by Siemens, Gordon, Ferranti, and others, is likely also to have a salutary effect in educating those so-called practical electricians whose ideas do not easily rise above ohms and volts. It has long been known that when the changes are sufficiently rapid, the phenomena are governed much more by induction, or electric inertia, than by mere resistance. On this principle much may be explained that would otherwise seem paradoxical. To take a comparatively simple case, conceive an electromagnet wound with two contiguous wires, upon which acts a given rapidly periodic electro-motive force. If one wire only be used, a certain amount of heat is developed in the circuit. Suppose now that the second wire is brought into operation in parallel—a proceeding equivalent to doubling the section of the original wire. An electrician accustomed only to constant currents would be sure to think that the heating effect would be doubled by the change, as much heat being developed in each wire separately as was at first in the single wire. But such a conclusion would be entirely erroneous. The total current, being governed practically by the self-induction of the circuit, would not be augmented by the accession of the second wire, and the total heating effect, so far from being doubled, would, in virtue of the superior conductivity, be halved.

During the last few years much interest has been felt in the reduction to an absolute standard of measurements of electro-motive force, current, resistance, etc., and to this end many laborious investigations have been undertaken. The subject is one that has engaged a good deal of my own attention, and I should naturally have felt inclined to dilate upon it, but that I feel it to be too abstruse and special to be dealt with in detail upon an occasion like the present. As regards resistance, I will merely remind you that the recent determinations have shown a so greatly improved agreement, that the Conference of Electricians assembled at Paris, in May, have felt themselves justified in defining the ohm for practical use as the resistance of a column of mercury of 0° C., 1 square millimetre in section, and 106 centimetres in length—a definition differing by a little more than 1 per cent. from that arrived at twenty years ago by a committee of this Association.

A standard of resistance once determined upon can be embodied in a "resistance coil," and copied without much trouble, and with great accuracy. But in order to complete the electrical system, a second standard of some kind is necessary. and this is not so easily embodied in a permanent form. It might conveniently consist of a standard galvanic cell, capable of being prepared in a definite manner, whose electro-motive force is once for all determined. Unfortunately, most of the batteries in ordinary use are for one reason or another unsuitable for this purpose, but the cell introduced by Mr. Latimer Clark, in which the metals are zinc in contact with saturated zinc sulphate and pure mercury in contact with mercurous sulphate, appears to give satisfactory results. According to my measurements, the electro-motive force of this cell is 1·435 theoretical volts.

We may also conveniently express the second absolute electrical measurement necessary to the completion of the system by taking advantage of Faraday's law, that the quantity of metal decomposed in an electrolytic cell is proportional to the whole quantity of electricity that passes. The best metal for the purpose is silver, deposited from a solution of the nitrate or of the chlorate. The results recently obtained by Professor Kohlrausch and by myself are in very good agreement, and the conclusion that one ampere flowing for one hour decomposes 4·025 grains of silver, can hardly be in error by more than a thousandth part. This number being known, the silver voltameter gives a ready and very accurate method of

measuring currents of intensity, varying from $\frac{1}{10}$ ampere to 4 or 5 amperes.

The beautiful and mysterious phenomena attending the discharge of electricity in nearly vacuous spaces have been investigated and in some degree explained by De la Rue, Crookes, Schuster, Moulton, and the lamented Spottiswoode, as well as by various able foreign experimenters. In a recent research Crookes has sought the origin of a bright citron-coloured band in the phosphorescent spectrum of certain earths, and after encountering difficulties and anomalies of a most bewildering kind, has succeeded in proving that it is due to yttrium, an element much more widely distributed than has been supposed. A conclusion like this is stated in a few words, but those only who have undergone similar experience are likely to appreciate the skill and perseverance of which it is the final reward.

A remarkable observation by Hall, of Baltimore, from which it appeared that the flow of electricity in a conducting sheet was disturbed by magnetic force, has been the subject of much discussion. Mr. Shelford Bidwell has brought forward experiments tending to prove that the effect is of a secondary character, due in the first instance to the mechanical force operating upon the conductor of an electric current when situated in a powerful magnetic field. Mr. Bidwell's view agrees in the main with Mr. Hall's division of the metals into two groups according to the direction of the effect.

Without doubt the most important achievement of the older generation of scientific men has been the establishment and application of the great laws of Thermo-dynamics, or, as it is often called, the Mechanical Theory of Heat. The first law, which asserts that heat and mechanical work can be transformed one into the other at a certain fixed rate, is now well understood by every student of physics, and the number expressing the mechanical equivalent of heat resulting from the experiments of Joule, has been confirmed by the researches of others, and especially of Rowland. But the second law, which practically is even more important than the first, is only now beginning to receive the full appreciation due to it. One reason of this may be found in a not unnatural confusion of ideas. Words do not always lend themselves readily to the demands that are made upon them by a growing science, and I think that the almost unavoidable use of the word equivalent in the statement of the first law is partly responsible for the little attention that is given to the second. For the second law so far contradicts the usual statement of the first, as to assert that equivalents of heat and work are not of equal value. While work can always be converted into heat, heat can only be converted into work under certain limitations. For every practical purpose the work is worth the most, and when we speak of equivalents, we use the word in the same sort of special sense as that in which chemists speak of equivalents of gold and iron. The second law teaches us that the real value of heat, as a source of mechanical power, depends upon the temperature of the body in which it resides; the hotter the body in relation to its surroundings, the more available the heat.

In order to see the relations which obtain between the first and the second law of Thermo-dynamics, it is only necessary for us to glance at the theory of the steam-engine. Not many years ago calculations were plentiful, demonstrating the inefficiency of the steam-engine on the basis of a comparison of the work actually got out of the engine with the mechanical equivalent of the heat supplied to the boiler. Such calculations took into account only the first law of Thermo-dynamics, which deals with the equivalents of heat and work, and have very little bearing upon the practical question of efficiency, which requires us to have regard also to the second law. According to that law the fraction of the total energy which can be converted into work depends upon the relative temperatures of the boiler and condenser; and it is, therefore, manifest that, as the temperature of the boiler cannot be raised indefinitely, it is impossible to utilize all the energy which, according to the first law of Thermo-dynamics, is resident in the coal.

On a sounder view of the matter, the efficiency of the steam-engine is found to be so high, that there is no great margin remaining for improvement. The higher initial temperature possible in the gas engine opens out much wider possibilities, and many good judges look forward to a time when the steam-engine will have to give way to its younger rival.

To return to the theoretical question, we may say with Sir W. Thomson, that though energy cannot be destroyed, it ever tends to be dissipated, or to pass from more available to less available forms. No one who has grasped this principle can fail to recognize its immense importance in the system of the Universe. Every change—chemical, thermal, or mechanical—which takes place, or can take place, in Nature does so, at the cost of a certain amount of available energy. If, therefore, we wish to inquire whether or not a proposed transformation can take place, the question to be considered is whether its occurrence would involve dissipation of energy. If not, the transformation is (under the circumstances of the case) absolutely excluded. Some years ago, in a lecture at the Royal Institution, I endeavoured to draw the attention of chemists to the importance of the principle of dissipation in relation to their science, pointing out the error of the usual assumption that a general criterion is to be found in respect of the development of heat. For example, the solution of a salt in water is, if I may be allowed the phrase, a downhill transformation. It involves dissipation of energy, and can therefore go forward; but in many cases it is associated with the absorption rather than with the development of heat. I am glad to take advantage of the present opportunity in order to repeat my recommendation, with an emphasis justified by actual achievement. The foundations laid by Thomson now bear an edifice of no mean proportions, thanks to the labours of several physicists, among whom must be especially mentioned Willard Gibbs and Helmholtz. The former has elaborated a theory of the equilibrium of heterogeneous substances, wide in its principles, and we cannot doubt far-reaching in its consequences. In a series of masterly papers Helmholtz has developed the conception of *free energy* with very important applications to the theory of the galvanic cell. He points out that the mere tendency to solution bears in some cases no small proportion to the affinities more usually reckoned chemical, and contributes largely to the total electromotive force. Also in our own country Dr. Alder Wright has published some valuable experiments relating to the subject.

From the further study of electrolysis we may expect to gain improved views as to the nature of the chemical reactions, and of the forces concerned in bringing them about. I am not qualified—I wish I were—to speak to you on recent progress in general chemistry. Perhaps my feelings towards a first love may blind me, but I cannot help thinking that the next great advance, of which we have already some foreshadowing, will come on this side. And if I might without presumption venture a word of recommendation, it would be in favour of a more minute study of the simpler chemical phenomena.

Under the head of scientific mechanics it is principally in relation to fluid motion that advances may be looked far. In speaking upon this subject I must limit myself almost entirely to experimental work. Theoretical hydro-dynamics, however important and interesting to the mathematician, are eminently unsuited to oral exposition. All I can do to attenuate an injustice, to which theorists are pretty well accustomed, is to refer you to the admirable reports of Mr. Hicks, published under the auspices of this Association.

The important and highly practical work of the late Mr. Froude in relation to the propulsion of ships is doubtless known to most of you. Recognizing the fallacy

of views then widely held as to the nature of the resistance to be overcome, he showed to demonstration that, in the case of fair-shaped bodies, we have to deal almost entirely with resistance dependent upon skin friction, and at high speeds upon the generation of surface waves by which energy is carried off. At speeds which are moderate in relation to the size of the ship, the resistance is practically dependent upon skin friction only. Although Professor Stokes and other mathematicians had previously published calculations pointing to the same conclusion, there can be no doubt that the view generally entertained was very different. At the first meeting of the Association which I ever attended, as an intelligent listener, at Bath in 1864, I well remember the surprise which greeted a statement by Rankine that he regarded skin friction as the only legitimate resistance to the progress of a well-designed ship. Mr. Froude's experiments have set the question at rest in a manner satisfactory to those who had little confidence in theorectical prevision.

In speaking of an explanation as satisfactory in which skin friction is accepted as the cause of resistance, I must guard myself against being supposed to mean that the nature of skin friction is itself well understood. Although its magnitude varies with the smoothness of the surface, we have no reason to think that it would disappear at any degree of smoothness consistent with an ultimate molecular structure. That it is connected with fluid viscosity is evident enough, but the *modus operandi* is still obscure.

Some important work bearing upon the subject has recently been published by Professor O. Reynolds, who has investigated the flow of water in tubes as dependent upon the velocity of motion and upon the size of the bore. The laws of motion in capillary tubes, discovered experimentally by Poiseuille, are in complete harmony with theory. The resistance varies as the velocity, and depends in a direct manner upon the constant of viscosity. But when we come to the larger pipes and higher velocities with which engineers usually have to deal, the theory which presupposes a regularly stratified motion evidently ceases to be applicable, and the problem becomes essentially identically with that of skin friction in relation to ship propulsion. Professor Reynolds has traced with much success the passage from the one state of things to the other, and has proved the applicability under these complicated conditions of the general laws of dynamical similarity as adapted to viscous fluids by Professor Stokes. In spite of the difficulties which beset both the theoretical and experimental treatment, we may hope to attain before long to a better understanding of a subject which is certainly second to none in scientific as well as practical interest.

As also closely connected with the mechanics of viscous fluids, I must not forget to mention an important series of experiments upon the friction of oiled surfaces, recently executed by Mr. Tower for the Institution of Mechanical Engineers. The results go far towards upsetting some ideas hitherto widely admitted. When the lubrication is adequate, the friction is found to be nearly independent of the load, and much smaller than is usually supposed, giving a coefficient as low as $\frac{1}{1000}$. When the layer of oil is well formed, the pressure between the solid surfaces is really borne by the fluid, and the work lost is spent in shearing, that is, in causing one stratum of the oil to glide over another.

In order to maintain its position, the fluid must possess a certain degree of viscosity, proportionate to the pressure; and even when this condition is satisfied, it would appear to be necessary that the layer should be thicker on the ingoing than on the outgoing side. We may, I believe, expect from Professor Stokes a further elucidation of the processes involved. In the meantime, it is obvious that the results already obtained are of the utmost value, and fully justify the action of the Institution in devoting a part of its resources to experimental work. We may hope, indeed that the example thus wisely set may be followed by other public bodies associated with various departments of industry.

I can do little more than refer to the interesting observations of Professor Darwin, Mr. Hunt, and M. Forel, on Ripplemark. The processes concerned would seem to be of a rather intricate character, and largely dependent upon fluid viscosity. It may be noted indeed that most of the still obscure phenomena of hydro-dynamics require for their elucidation a better comprehension of the laws of viscous motion. The subject is one which offers peculiar difficulties. In some problems in which I have lately been interested, a circulating motion presents itself of the kind which the mathematician excludes from the first when he is treating of fluids destitute altogether of viscosity. The intensity of this motion proves, however, to be independent of the coefficient of viscosity, so that it cannot be correctly dismissed from consideration as a consequence of a supposition that the viscosity is infinitely small. The apparent breach of continuity can be explained, but it shows how much care is needful in dealing with the subject, and how easy it is to fall into error.

The nature of gaseous viscosity, as due to the diffusion of momentum, has been made clear by the theoretical and experimental researches of Maxwell. A flat disc moving in its own plane between two parallel solid surfaces is impeded by the necessity of shearing the intervening layers of gas, and the magnitude of the hindrance is proportional to the velocity of the motion and to the viscosity of the gas, so that under similar circumstances this effect may be taken as a measure, or rather definition, of the viscosity. From the dynamical theory of gases, to the development of which he contributed so much, Maxwell drew the startling conclusion that the viscosity of a gas should be independent of its density,—that within wide limits the resistance to the moving disc should be scarcely diminished by pumping out the gas, so as to form a partial vacuum. Experiment fully confirmed this theoretical anticipation, one of the most remarkable to be found in the whole history of science, and proved that the swinging disc was retarded by the gas, as much when the barometer stood at half an inch as when it stood at thirty inches. It was obvious, of course, that the law must have a limit, that at a certain point of exhaustion the gas must begin to lose its power; and I remember discussing with Maxwell, soon after the publication of his experiments, the whereabouts of the point at which the gas would cease to produce its ordinary effect. His apparatus, however, was quite unsuited for high degrees of exhaustion, and the failure of the law was first observed by Kundt and Warburg, at pressures below 1 mm. of mercury. Subsequently the matter has been thoroughly examined by Crookes, who extended his observations to the highest degrees of exhaustion as measured by MacLeod's gauge. Perhaps the most remarkable results relate to hydrogen. From the atmospheric pressure of 760 mm. down to about $\frac{1}{2}$ mm. of mercury the viscosity is sensibly constant. From this point to the highest vacua, in which less than one-millionth of the original gas remains, the coefficient of viscosity drops down gradually to a small fraction of its original value. In these vacua Mr. Crookes regards the gas as having assumed a different, ultra-gaseous, condition; but we must remember that the phenomena have relation to the other circumstances of the case, especially the dimensions of the vessel, as well as to the condition of the gas.

Such an achievement as the prediction of Maxwell's law of viscosity has, of course, drawn increased attention to the dynamical theory of gases. The success which has attended the theory in the hands of Clausius, Maxwell, Boltzmann and other mathematicians, not only in relation to viscosity, but over a large part of the entire field of our knowledge of gases, proves that some of its fundamental postulates are in harmony with the reality of Nature. At the same time, it presents serious difficulties; and we cannot but feel that while the electrical

and optical properties of gases remain out of relation to the theory, no final judgment is possible. The growth of experimental knowledge may be trusted to clear up many doubtful points, and a younger generation of theorists will bring to bear improved mathematical weapons. In the meantime we may fairly congratulate ourselves on the possession of a guide which has already conducted us to a position which could hardly otherwise have been attained.

In Optics attention has naturally centred upon the spectrum. The mystery attaching to the invisible rays lying beyond the red has been fathomed to an extent that, a few years ago, would have seemed almost impossible. By the use of special photographic methods Abney has mapped out the peculiarities of this region with such success that our knowledge of it begins to be comparable with that of the parts visible to the eye. Equally important work has been done by Langley, using a refined invention of his own based upon the principle of Siemens' pyrometer. This instrument measures the actual energy of the radiation, and thus expresses the effects of various parts of the spectrum upon a common scale, independent of the properties of the eye and of sensitive photographic preparations. Interesting results have also been obtained by Becquerel, whose method is founded upon a curious action of the ultra-red rays in enfeebling the light emitted by phosphorescent substances. One of the most startling of Langley's conclusions relates to the influence of the atmosphere in modifying the quality of solar light. By the comparison of observations made through varying thicknesses of air, he shows that the atmospheric absorption tells most upon the light of high refrangibility; so that, to an eye situated outside the atmosphere, the sun would present a decidedly bluish tint. It would be interesting to compare the experimental numbers with the law of scattering of light by small particles given some years ago as the result of theory. The demonstration by Langley of the inadequacy of Cauchy's law of dispersion to represent the relation between refrangibility and wave-length in the lower part of the spectrum must have an important bearing upon optical theory.

The investigation of the relation of the visible and ultra-violet spectrum to various forms of matter has occupied the attention of a host of able workers, among whom none have been more successful than my colleagues at Cambridge, Professors Liveing and Dewar. The subject is too large both for the occasion and for the individual, and I must pass it by. But, as more closely related to Optics proper, I cannot resist recalling to your notice a beautiful application of the idea of Doppler to the discrimination of the origin of certain lines observed in the solar spectrum. If a vibrating body have a general motion of approach or recession, the waves emitted from it reach the observer with a frequency which in the first case exceeds, and in the second case falls short of, the real frequency of the vibrations themselves. The consequence is that, if a glowing gas be in motion in the line of sight, the spectral lines are thereby displaced from the position that they would occupy were the gas at rest—a principle which, in the hands of Huggins and others, has led to a determination of the motion of certain fixed stars relatively to the solar system. But the sun is itself in rotation, and thus the position of a solar spectral line is slightly different according as the light comes from the advancing or from the retreating limb. This displacement was, I believe, first observed by Thollon; but what I desire now to draw attention to is the application of it by Cornu to determine whether a line is of solar or atmospheric origin. For this purpose a small image of the sun is thrown upon the slit of the spectroscope, and caused to vibrate two or three times a second, in such a manner that the light entering the instrument comes alternately from the advancing and retreating limbs. Under these circumstances a line due to absorption within the sun appears to tremble, as the result of slight alternately opposite displacements. But if the seat of the absorption be in the atmosphere, it is a matter of indifference from what part of the sun the light originally proceeds, and the line maintains its position in spite of the oscillation of the image upon the slit of the spectroscope. In this way Cornu was able to make a discrimination which can only otherwise be effected by a difficult comparison of appearances under various solar altitudes.

The instrumental weapon of investigation, the spectroscope itself, has made important advances. On the theoretical side, we have for our guidance the law that the optical power in gratings is proportional to the total number of lines accurately ruled, without regard to the degree of closeness, and in prisms that it is proportional to the thickness of glass traversed. The magnificent gratings of Rowland are a new power in the hands of the spectroscopist, and as triumphs of mechanical art seem to be little short of perfection. In our own report for 1882, Mr. Mallock has described a machine, constructed by him, for ruling large diffraction gratings, similar in some respects to that of Rowland.

The great optical constant, the velocity of light, has been the subject of three distinct investigations by Cornu, Michelson, and Forbes. As may be supposed, the matter is of no ordinary difficulty, and it is therefore not surprising that the agreement should be less decided than could be wished. From their observations, which were made by a modification of Fizeau's method of the toothed wheel, Young and Forbes drew the conclusion that the velocity of light *in vacuo* varies from colour to colour, to such an extent that the velocity of blue light is nearly 2 per cent. greater than that of red light. Such a variation is quite opposed to existing theoretical notions, and could only be accepted on the strongest evidence. Mr. Michelson, whose method (that of Foucault) is well suited to bring into prominence a variation of velocity with wave length, informs me that he has recently repeated his experiments with special reference to the point in question, and has arrived at the conclusion that no variation exists comparable with that asserted by Young and Forbes. The actual velocity differs little from that found from his first series of experiments, and may be taken to be 299,800 kilometres per second.

It is remarkable how many of the playthings of our childhood give rise to questions of the deepest scientific interest. The top is, or may be understood, but a complete comprehension of the kite and of the soap-bubble would carry us far beyond our present stage of knowledge. In spite of the admirable investigations of Plateau, it still remains a mystery why soapy water stands almost alone among fluids as a material for bubbles. The beautiful development of colour was long ago ascribed to the interference of light, called into play by the gradual thinning of the film. In accordance with this view the tint is determined solely by the thickness of the film, and the refractive index of the fluid. Some of the phenomena are, however, so curious, as to have led excellent observers like Brewster to reject the theory of thin plates, and to assume the secretion of various kinds of colouring matter. If the rim of a wine-glass be dipped in soapy water, and then held in a vertical position, horizontal bands soon begin to show at the top of the film, and extend themselves gradually downwards. According to Brewster these bands are not formed by the "subsidence and gradual thinning of the film," because they maintain their horizontal position when the glass is turned round its axis. The experiment is both easy and interesting; but the conclusion drawn from it cannot be accepted. The fact is that the various parts of the film cannot quickly alter their thickness, and hence when the glass is rotated they rearrange themselves in order of superficial density, the thinner parts floating up over, or through, the thicker parts. Only thus can the tendency be satisfied for the centre of gravity to assume the lowest possible position.

When the thickness of a film falls below a small fraction of the length of a wave of light, the colour disappears and is replaced by an intense blackness. Professors Reinold and Rücker have recently made the remarkable observation that the whole of the black region, soon after its formation, is of uniform thickness, the passage from the black to the coloured portions being exceedingly abrupt. By two independent methods they have determined the thickness of the black film to lie between seven and fourteen millionths of a millimetre; so that the thinnest films correspond to about one-seventieth of a wave-length of light. The importance of these results in regard to molecular theory is too obvious to be insisted upon.

The beautiful inventions of the telephone and the phonograph, although in the main dependent upon principles long since established, have imparted a new interest to the study of Acoustics. The former, apart from its uses in everyday life, has became in the hands of its inventor, Graham Bell, and of Hughes, an instrument of first-class scientific importance. The theory of its action is still in some respects obscure, as is shown by the comparative failure of the many attempts to improve it. In connection with some explanations that have been offered, we do well to remember that molecular changes in solid masses are inaudible in themselves, and can only be manifested to our ears by the generation of a to and fro motion of the external surface extending over a sensible area. If the surface of a solid remains undisturbed, our ears can tell us nothing of what goes on in the interior.

In theoretical acoustics progress has been steadily maintained, and many phenomena, which were obscure twenty or thirty years ago, have since received adequate explanation. If some important practical questions remain unsolved, one reason is that they have not yet been definitely stated. Almost everything in connection with the ordinary use of our senses presents peculiar difficulties to scientific investigation. Some kinds of information with regard to their surroundings are of such paramount importance to successive generations of living beings, that they have learned to interpret indications which, from a physical point of view, are of the slenderest character. Every day we are in the habit of recognizing, without much difficulty, the quarter from which a sound proceeds, but by what steps we attain that end has not yet been satisfactorily explained. It has been proved that when proper precautions are taken we are unable to distinguish whether a pure tone (as from a vibrating tuning fork held over a suitable resonator) comes to us from in front or from behind. This is what might have been expected from an *d priori* point of view; but what would not have been expected is that with almost any other sort of sound, from a clap of the hands to the clearest vowel sound, the discrimination is not only possible but easy and instinctive. In these cases it does not appear how the possession of two ears helps us, though there is some evidence that it does; and even when sounds come to us from the right or left, the explanation of the ready discrimination which is then possible with pure tones is not so easy as might at first appear. We should be inclined to think that the sound was heard much more loudly with the ear that is turned towards than with the ear that is turned from it, and that in this way the direction was recognized. But if we try the experiment, we find that, at any rate with notes near the middle of the musical scale, the difference of loudness is by no means so very great. The wave-lengths of such notes are long enough in relation to the dimensions of the head to forbid the formation of anything like a sound shadow in which the averted ear might be sheltered.

In concluding this imperfect survey of recent progress in physics, I must warn you emphatically that much of great importance has been passed over altogether. I should have liked to speak to you of those far reaching speculations, especially associated with the name of Maxwell, in which light is regarded as a disturbance in an electro-magnetic medium. Indeed, at one time, I had thought of taking the scientific work of Maxwell as the principal theme of this address. But, like most men of genius, Maxwell delighted in questions too obscure and difficult for hasty treatment, and thus much of his work could hardly be considered upon such an occasion as the present. His biography has recently been published, and should be read by all who are interested in science and in scientific men. His many-sided character, the quaintness of his humour, the penetration of his intellect, his simple but deep religious feeling, the affection between son and father, the devotion of husband to wife, all combine to form a rare and fascinating picture. To estimate rightly his influence upon the present state of science, we must regard not only the work that he executed himself, important as that was, but also the ideas and the spirit which he communicated to others. Speaking for myself as one who in a special sense entered into his labours, I should find it difficult to express adequately my feeling of obligation. The impress of his thoughts may be recognized in much of the best work of the present time. As a teacher and examiner he was well acquainted with the almost universal tendency of uninstructed minds to elevate phrases above things: to refer, for example, to the principle of the conservation of energy for an explanation of the persistent rotation of a fly-wheel, almost in the style of the doctor in 'Le Malade Imaginaire,' who explains the fact that opium sends you to sleep by its soporific virtue. Maxwell's endeavour was always to keep the facts in the foreground, and to his influence, in conjunction with that of Thomson and Helmholtz, is largely due that elimination of unnecessary hypothesis which is one of the distinguishing characteristics of the science of the present day.

In speaking unfavourably of superfluous hypothesis, let me not be misunderstood. Science is nothing without generalizations. Detached and ill-assorted facts are only raw material, and in the absence of a theoretical solvent, have but little nutritive value. At the present time and in some departments, the accumulation of material is so rapid that there is danger of indigestion. By a fiction as remarkable as any to be found in law, what has once been published, even though it be in the Russian language, is usually spoken of as "known," and it is often forgotten that the re-discovery in the library may be a more difficult and uncertain process than the first discovery in the laboratory. In this matter we are greatly dependent upon annual reports and abstracts, issued principally in Germany, without which the search for the discoveries of a little-known author would be well-nigh hopeless. Much useful work has been done in this direction in connection with our Association. Such critical reports as those upon Hydro-dynamics, upon Tides, and upon Spectroscopy, guide the investigator to the points most requiring attention, and in discussing past achievements contribute in no small degree to future progress. But though good work has been done, much yet remains to do.

If, as is sometimes supposed, science consisted in nothing but the laborious accumulation of facts, it would soon come to a stand-still, crushed, as it were, under its own weight. The suggestion of a new idea, or the detection of a law, supersedes much that had previously been a burden upon the memory, and by introducing order and coherence facilitates the retention of the remainder in an available form. Those who are acquainted with the writings of the older electricians will understand my meaning when I instance the discovery of Ohm's law as a step by which the science was rendered easier to understand and to remember. Two processes are thus at work side by side, the reception of new material and the digestion and assimilation of the old; and as both are essential, we may spare ourselves the discussion of their relative importance. One remark, however, should be

made. The work which deserves, but I am afraid does not always receive, the most credit is that in which discovery and explanation go hand in hand, in which not only are new facts presented, but their relation to old ones is pointed out.

In making oneself acquainted with what has been done in any subject, it is good policy to consult first the writers of highest general reputation. Although in scientific matters we should aim at independent judgment, and not rely too much upon authority, it remains true that a good deal must often be taken upon trust. Occasionally an observation is so simple and easily repeated, that it scarcely matters from whom it proceeds; but as a rule it can hardly carry full weight when put forward by a novice whose care and judgment there has been no opportunity of testing, and whose irresponsibility may tempt him to "take shots," as it is called. Those who have had experience in accurate work know how easy it would be to save time and trouble by omitting precautions and passing over discrepancies, and yet, even without dishonest intention, to convey the impression of conscientious attention to details. Although the most careful and experienced cannot hope to escape occasional mistakes, the effective value of this kind of work depends much upon the reputation of the individual responsible for it.

In estimating the present position and prospects of experimental science, there is good ground for encouragement. The multiplication of laboratories gives to the younger generation opportunities such as have never existed before, and which excite the envy of those who have had to learn in middle life much that now forms part of an undergraduate course. As to the management of such institutions there is room for a healthy difference of opinion. For many kinds of original work, especially in connection with accurate measurement, there is need of expensive apparatus; and it is often difficult to persuade a student to do his best with imperfect appliances when he knows that by other means a better result could be attained with greater facility. Nevertheless, it seems to me important to discourage too great reliance upon the instrument maker. Much of the best original work has been done with the homeliest appliances; and the endeavour to turn to the best account the means that may be at hand develops ingenuity and resource more than the most elaborate determinations with ready-made instruments. There is danger otherwise that the experimental education of a plodding student should be too mechanical and artificial, so that he is puzzled by small changes of apparatus much as many school-boys are puzzled by a transposition of the letters in a diagram of Euclid.

From the general spread of a more scientific education, we are warranted in expecting important results. Just as there are some brilliant literary men with an inability, or at least a distaste practically amounting to inability, for scientific ideas, so there are a few with scientific tastes whose imaginations are never touched by merely literary studies. To save these from intellectual stagnation during several important years of their lives is something gained; but the thorough-going advocates of scientific education aim at much more. To them it appears strange, and almost monstrous, that the dead languages should hold the place they do in general education; and it can hardly be denied that their supremacy is the result of routine rather than of argument. I do not, myself, take up the extreme position. I doubt whether an exclusively scientific training would be satisfactory; and where there is plenty of time and a literary aptitude I can believe that Latin and Greek may make a good foundation. But it is useless to discuss the question upon the supposition that the majority of boys attain either to a knowledge of the languages or to an appreciation of the writings of the ancient authors. The contrary is notoriously the truth; and the defenders of the existing system usually take their stand upon the excellence of its discipline. From this point of view there is something to be said. The laziest boy must exert himself a little in puzzling out a sentence with grammar and dictionary, while instruction and supervision are easy to organize and not too costly. But when the case is stated plainly, few will agree that we can afford so entirely to disregard results. In after life the intellectual energies are usually engrossed with business, and no further opportunity is found for attacking the difficulties which block the gateways of knowledge. Mathematics, especially, if not learned young, are likely to remain unlearned. I will not further insist upon the educational importance of mathematics and science, because with respect to them I shall probably be supposed to be prejudiced. But of modern languages I am ignorant enough to give value to my advocacy. I believe that French and German, if properly taught, which I admit they rarely are at present, would go far to replace Latin and Greek from a disciplinary point of view, while the actual value of the acquisition would, in the majority of cases, be incomparably greater. In half the time usually devoted, without success, to the classical languages, most boys could acquire a really serviceable knowledge of French and German. History and the serious study of English literature, now shamefully neglected, would also find a place in such a scheme.

There is one objection often felt to a modernized education, as to which a word may not be without use. Many excellent people are afraid of science as tending towards materialism. That such apprehension should exist is not surprising, for unfortunately there are writers, speaking in the name of science, who have set themselves to foster it. It is true that among scientific men, as in other classes, crude views are to be met with as to the deeper things of Nature; but that the life-long beliefs of Newton, of Faraday, and of Maxwell, are inconsistent with the scientific habit of mind, is surely a proposition which I need not pause to refute. It would be easy, however, to lay too much stress upon the opinions of even such distinguished workers as these. Men, who devote their lives to investigation, cultivate a love of truth for its own sake, and endeavour instinctively to clear up, and not, as is too often the object in business and politics, to obscure a difficult question. So far the opinion of a scientific worker may have a special value; but I do not think that he has a claim, superior to that of other educated men, to assume the attitude of a prophet. In his heart he knows that underneath the theories that he constructs there lie contradictions which he cannot reconcile. The higher mysteries of being, if penetrable at all by human intellect, require other weapons than those of calculation and experiment.

Without encroaching upon grounds appertaining to the theologian and the philosopher, the domain of natural science is surely broad enough to satisfy the wildest ambition of its devotees. In other departments of human life and interest, true progress is rather an article of faith than a rational belief; but in science a retrograde movement is, from the nature of the case, almost impossible. Increasing knowledge brings with it increasing power, and great as are the triumphs of the present century, we may well believe that they are but a foretaste of what discovery and invention have yet in store for mankind. Encouraged by the thought that our labours cannot be thrown away, let us redouble our efforts in the noble struggle. In the Old World and in the New, recruits must be enlisted to fill the place of those whose work is done. Happy should I be if, through this visit of the Association, or by any words of mine, a larger measure of the youthful activity of the West could be drawn into this service. The work may be hard, and the discipline severe; but the interest never fails, and great is the privilege of achievement.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Haydon, Stephenson, Stanford, Kay, Tyrer, Rossiter, Maben, Thresh, Southall, Hyslop, Ignorescens, H. M. S.

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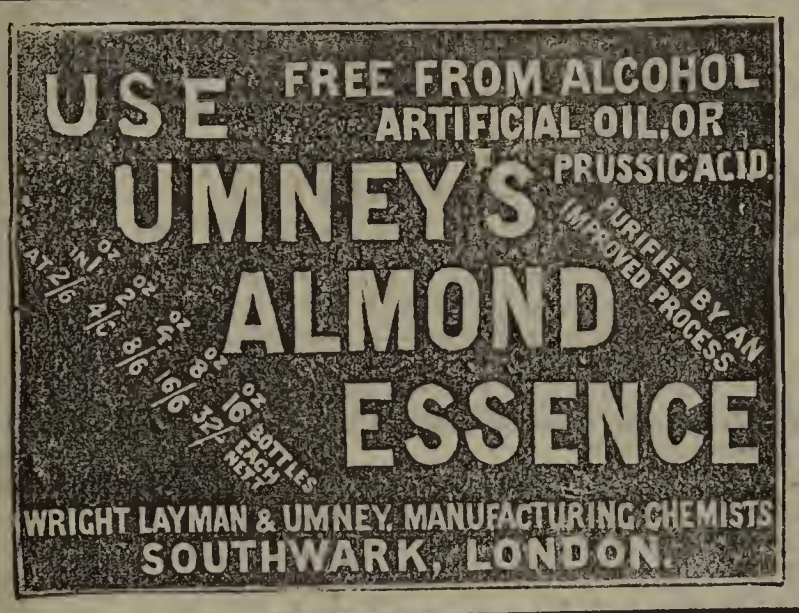

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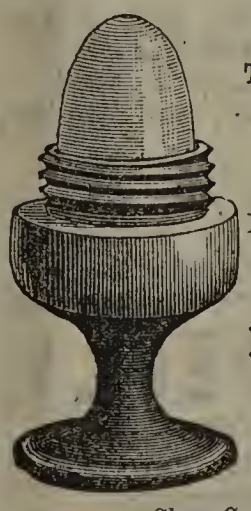

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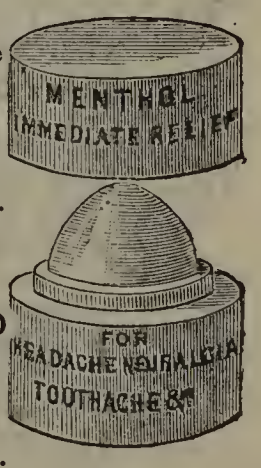

N.B.

Prices Reduced to 7/- and 3/6 per doz. *for the Pure Menthol Cones* (exempt under the Act).

Show Cards and Counter Bills on application.

T. CHRISTY & CO., 155, Fenchurch St., London

Proprietors of MYOCOM FLY GUM, *in tins at* 1/-, 2/6 *&* 5/- *each.*

Chemists' Tea Agency.

WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S
INTERMEDIATE TEA, 2s. per lb.
BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—
AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

KAY BROTHERS, *Operative Chemists and Wholesale Druggists,*
(Successors to SIMS, SHAW & HORNBY. Founded 1786).
STOCKPORT,
MANUFACTURERS OF

Acid Sulphurous.
Bird Lime.
Dec. Senegæ Co. Conc.
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Emp. Plumbi.
,, Roborans.
,, Resinæ.
Emp. Picis.
Ess. Zingib (Soluble).
,, Rosæ. Co.
Oxymel Scillæ.
Syr. Ferri Phosph. Co.
,, Rhœados.
,, Violæ, &c., &c.

"COAGULINE" TRADE MARK.
Kay's New Transparent Cement for Broken Articles.

KAY'S COMPOUND ESSENCE
Of LINSEED, ANISEED, SENEGA, SQUILL, TOLU, &c. (with Chlorodyne).
"The Stockport Remedy" for Coughs and Colds.
LINSEED LOZENGES (Solidified Linseed Tea).
CHLORO-LINSEED COUGH LOZENGES.—A medicated Linseed Extract. [Hoarseness, &c.
KAY'S THROAT LOZENGES, for Relaxed or Sore Throat,
KAY'S INSTANT CURE for Toothache.
PAINLESS SOLVENT for Corns and Warts.
LINUM CATHARTICUM PILLS (of the Purging Linseed).
KAY'S TIC PILLS.—A specific and pure Nerve-Tonic.
STRAMONIUM CIGARETTES.—For Asthma.
CUE CEMENT.—For tipping Billiard Cues.
IMPROVED CUE TIP FIXER.
MARKING INK for Linen.
ARNICA HEALING POWDER.—Toilet.
KAY'S TUBES for Feeding Bottles, with patent glass valve. Fit all bottles, and prevent children sucking air.
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SAPO-LINI, a Saponified Linseed Jelly; an excellent Toilet Soap.
All articles containing Scheduled Poisons are so labelled.
THE BEST ELASTIC STOCKINGS, **LEGGINGS, SOCKS, KNEE CAPS, &c.** } 25 % discount to Chemists.
Prices, Circulars, Show Cards, Specimens, &c., on application.

PETROLEUM JELLY,
EQUAL TO AND CHEAPER THAN VASELINE.
SANITARY FLUID AND SHEEP DIP,
THE CHEAPEST AND BEST DISINFECTANT.
Grease, Pitch, Asphalte, and all products of Tar and Rosin.
Samples and Prices on application.
GRINDLEY & CO. POPLAR, LONDON, E.

ROSE'S LIME JUICE CORDIAL

The Favourite Summer Beverage; wholesome and refreshing. A Delicious Cooling Drink— Effectually Quenching Thirst.

ROSE'S LIME JUICE CORDIAL.
Prepared from the Lime Fruit. Is entirely Free of Alcohol. A Wholesome Family Bevcrage for Dinner or Supper Table.

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A Delicious Drink in Water— Effervescing in all Aerated Waters. An excellent Stimulant blended with Spirits.

ROSE'S LIME JUICE CORDIAL.
The Perfection of Fruit Beverages. Delicious, Cooling and Refreshing in Water— Effervescing in all the Mineral Waters

ROSE'S LIME JUICE CORDIAL.
The Favourite Beverage for Lunch, Dinner or Supper Partics. Eminently Wholesome. No table should be without it.

ROSE'S LIME JUICE CORDIAL.
A Real Summer Delicacy. Cooling and Refreshing in Water. Effervescing in all Aerated Waters. Effectually Quenching Thirst.

ROSE'S LIME JUICE CORDIAL.
The favourite Temperance Beverage; Delicious, Cooling and Refreshing. Entirely Free of Alcohol. Eminently Wholesome.

ROSE'S LIME JUICE CORDIAL.
An excellent Substitute for the Lemon as a flavouring in Summer Drinks, Claret Cups, &c. Cooling and Refreshing.

ROSE'S LIME JUICE CORDIAL.
Is highly Medicinal, Cooling and Purifying the Blood. An excellent Stomachic, Assisting Digestion.

ROSE'S LIME JUICE CORDIAL.
No Beverage has received higher recommendations from the Medical Profession as eminently wholesome.—See *Lancet*.

ROSE'S LIME JUICE CORDIAL.
The Family Dinner Table has additional attractions when supplied with Rose's Lime Juice Cordial in water.

ROSE'S LIME JUICE CORDIAL.
Non-Alcoholic. It has now become the favourite Beverage all the year round.

ROSE'S LIME JUICE CORDIAL.
Sold everywhere. As a protection against imitations, Purchasers should order "ROSE'S LIME JUICE CORDIAL."

ROSE'S LIME JUICE CORDIAL.
It has been decided in various Chancery Suits that ROSE & Co., LONDON, are the original introducers of LIME JUICE CORDIAL.

ROSE'S LIME JUICE CORDIAL
Exported to all parts of the World.
Special Export Terms.
Wholesale Stores, 11, CURTAIN ROAD, LONDON; and at 41, MITCHELL STREET, LEITH.

REGISTERED.

PURE AËRATED WATERS
Ellis's Ruthin Waters.
CRYSTAL SPRINGS
Soda, Potass, Seltzer, Lemonade, Lithia, and for GOUT, Lithia and Potass.
CORKS BRANDED "R. ELLIS & SON, RUTHIN," and every label bears their trade mark. Sold everywhere, and Wholesale of R. ELLIS & SON, Ruthin, North Wales. London Agents: W. BEST & SONS, Henrietta St., Cavendish Sq.

TERMS FOR ADVERTISEMENTS
IN THE
PHARMACEUTICAL JOURNAL.
GUARANTEED CIRCULATION
7000 Copies Weekly.

Assistants Wanted, Apprenticeships Wanted, Businesses for Disposal, Wanted to Purchase, also Advertisements of a general character (in column).—Seven lines (50 words) or less, 4*s.* 6*d.* Each line (seven words) extra, 6*d.*

Special terms for **Assistants seeking Engagements** *only*.—Four lines (28 words) or less, 2*s.* 6*d.* Each line (seven words) extra, 6d.

Postage stamps *cannot be received*, but payment may be made either by **Cash** in a Registered Letter, or by **Cheque** crossed London and County Bank, by **Postal Order**, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL.

Advertisers are requested to observe :—

1.—That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.
2.—That letters addressed to initials or to fictitious names at a Post Office are not taken in, but are at once sent back to the writers by the Post Office Authorities.
3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers.

Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months ; 10*s.* for six months ; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

J. & A. CHURCHILL, 11, New Burlington St., London, W.

West London Hospital Preparatory
SCHOOL OF MEDICINE.

The FIRST SESSION will commence in October next.

The objects aimed at in this School may be shortly stated as follows :—

1. To give in a more complete and systematic manner than has heretofore ever been attempted, all the advantages of a year's pupilage at a first-class provincial infirmary or county hospital.
2. To give instruction in Natural Science.
3. To give commencing Medical Students an early insight into Medical work, so that they may, without needless loss of time or money, be able to judge whether or not they have chosen the right profession.

Students will receive thorough and practical tuition in Osteology, Chemistry, Physics, Materia Medica, Pharmacy, Botany, and Elementary Physiology.

The Hospital contains 101 beds. 1200 in-patients and 14,000 out-patients are received annually.

FEES, payable in advance:—For the Complete Course, including one year's Hospital Practice, 25 guineas. For an extra six months, 7 guineas. For one Winter Session, 18 guineas. For one Summer Session, 12 guineas. Separate Courses of Lectures may be attended for 3 guineas each Course.

Prospectuses, &c., may be obtained from the Secretary of the School, West London Hospital, Hammersmith, W. ; or from Mr. C. B. Keetley, 20, Princes Street, Hanover Square, W.

OWENS COLLEGE, MANCHESTER.

Prospectuses of the Pharmaceutical Courses in the Session 1884-5 will be forwarded on application.

J. HOLME NICHOLSON, Registrar.

St. Thomas's Hospital Medical School,
ALBERT EMBANKMENT, LONDON, S.E.

The WINTER SESSION of 1884-5 will commence on OCTOBER 1st, when an Introductory Address will be delivered by Sir J. Risdon Bennett, M.D., F.R.S., at 3 p.m.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

Guy's Hospital.—The Medical Session
commences on Wednesday, October 1st.

The Hospital contains besides the beds for Medical and Surgical cases, wards for Obstetric, Ophthalmic, and other special departments.

Special Classes are held in the Hospital for Students preparing for the Examinations of the University of London and of other examining boards.

APPOINTMENTS.—The House-Surgeons and House-Physicians, the Obstetric Residents, Clinical Assistants and Dressers are selected from the Students according to merit and without payment. There are also a large number of Junior Appointments, every part of the Hospital Practice being systematically employed for instruction.

ENTRANCE SCHOLARSHIPS.—Open Scholarship of 125 guineas, in Classics, Mathematics, and Modern Languages. Open Scholarship of 125 guineas, in Chemistry, Physics, Botany, and Zoology.

PRIZES, &c.—Six Scholarships, varying in value from £10 to £50 each, for general proficiency in Medical Study; the Treasurer's Gold Medal in Medicine ; the Treasurer's Gold Medal in Surgery ; the Gurney Hoare Prize of £25 for Clinical Study ; the Beaney Prize of 30 guineas for Pathology ; the Sands Cox Scholarship of £15 per annum for three years for Physiology ; the Joseph Hoare Prizes of £25 and £10 ; the Michael Harris Prize of £10 for Anatomy ; the Mackenzie Bacon Prize of £10 for Ophthalmoscopy ; the Mackenzie Bacon Prize for Nervous Diseases of £15 ; the Burdett Prize for Hygiene, value £10.

For Prospectus and further information apply to the Dean, Dr. F. Taylor.

Guy's Hospital, London, S.E., July, 1884.

The Mason College, Birmingham.
SESSION 1884-85.

FACULTIES OF SCIENCE AND ARTS.

The SESSION will commence on Friday, the 3rd of October next.

All departments of the College are open to both sexes on the same terms. Special arrangements are made for the convenience of Ladies.

Syllabuses containing full information as to Admission of Students, Courses of Instruction, Fees, Entrance and other Scholarships, &c., may be had from CORNISH BROTHERS, Birmingham, or from the undersigned. Price 6d. By Post, 7½d.

GEO. H. MORLEY, Secretary.

VICTORIA UNIVERSITY.

DEGREES IN MEDICINE AND SURGERY.

Full particulars as to Courses of Study, Examinations, &c., may be obtained from the Registrar. An Entrance Examination in Arts (recognized by the General Medical Council) will be held in the Owens College on Monday, October 6th, and following days. Candidates will be required to pay a fee of £1, and to furnish the Registrar with a certificate from their last instructor or some other suitable person, stating that they are proper persons to be admitted to the Examination. Attendance to receive fees and to enter students for the Examinations on September 30th, October 1st and 2nd, from 10 a.m. to 1 p.m., and from 2 to 4 p.m.

A. T. BENTLEY, M.A., Registrar.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

FOURTEENTH SESSION, 1883-4.

Entries now begun for the term commencing Sept. next.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

× × × ×

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(*From the Royal School of Mines*),

6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.

STUDENTS REASSEMBLE SEPTEMBER 3rd.

Notwithstanding the great mortality at the June and July Minors, over seventy-five per cent. of my students were successful at the two combined. Individual personal instruction, as usual. No demonstrators. All students work *separately*, therefore entry may be made at and for any length of time. Postal teaching for Preliminary and Minor a speciality; books unnecessary, notes sufficient. Send stamp for terms, &c.

LABORATORY CLOSE TO GOWER STREET STATION.

× × × ×

PHARMACEUTICAL PRELIMINARY, LONDON MATRICULATION, AND ALL MEDICAL PRELIMINARIES.

RAPID and thorough preparation, privately and in class. Postal Tuition for these Examinations and Bell Scholarship. For particulars, enclose stamp, Mr. A. DAWES, 1st B.A. Lond., Adderstone, Vardens Rd., New Wandsworth, S.W. (close to Clapham Junction Station.)

MR. JUDD'S CLASSES

MINOR AND PRELIMINARY.

The Morning Class for the October Exam. will begin on the 1st Monday in September.

Resident and non-resident pupils can be received at any time for the October Minor and Preliminary.

Evening Classes from 7.30 to 10 o'clock. *Advanced* Minor on Monday and Thursday. *Intermediate and Elementary* on Wednesday and Friday. Preliminary Class on Tuesday, at 7 p.m. Preliminary Classes also on Tuesday and Friday afternoons, at 2.30. Successes are scored from these classes at each Minor and Preliminary Exam.

For terms, &c., call or write, with stamp, to

Mr. H. JUDD,

West Central School of Pharmacy,

31, REGENT SQUARE, W.C.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 47 out of 51 Pupils passed the last Examinations.

WESTMINSTER COLLEGE

TRINITY SQUARE BOROUGH, LONDON, S.E.

The next Session will commence on Monday, September 1st.

FEES:—

To the October Examination	...	£5 5s.
To the December ,,	... ...	£8 8s.
Six Months' Course	... ...	£10 10s.
Twelve Months' Course	... ...	£15 15s.

At the Pharmaceutical Examinations held last month, the following 29 Students of the Westminster College were successful in passing the MINOR Examination:—

*Mr. A. BANKS	Mr. R. M. LEWIS
* ,, W. BARKER	* ,, C. O. MORRISON
* ,, T. N. BROOKE	,, G. MOOR
,, B. H. BUTLER	,, G. NEALE
,, W. CLARKE	,, J. NEWTON
,, C. ELLIS	,, F. ROOKLEDGE
,, H. C. GLANVILLE	,, F. T. SANDERS
,, W. H. GODSLAND	,, B. SMITH
* ,, E. E. HALL	,, J. STURDY
,, J. H. HOPPER	* ,, W. SUMNER
,, A. J. HEMSTEAD	,, T. E. TAYLOR
* ,, J. HULLAND	,, A. WALDRON,
* ,, S. HUGGINS	,, H. P. WITHERS
* ,, G. JACQUES	,, H. E. YOUNG
* ,, J. K. JONES	

PRELIMINARY.

*Mr. R. COLWILL *Mr. N. COUVE

Mr. A. T. RILEY.

* Resident Students.

BOARD AND APARTMENTS FOR STUDENTS.

In order to save gentlemen the trouble and uncertainty of obtaining comfortable lodgings, Mr. Wills (Principal) has undertaken to provide apartments for a limited number in the immediate neighbourhood, where every comfort and cleanliness is insured. All such students meet at Mr. Wills' private residence for meals.

Terms on Application.

For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON.

MEMORY AND SUCCESS

WHAT IS IT THAT contributes greatly to success?
A good memory.

WHAT IS IT THAT always causes failure in life?
A bad memory.

WHAT IS IT THAT is indispensable to every Lady and Gentleman, Student, Chemist, Physician, Surgeon, &c.?
A good memory.

WHAT IS IT THAT every one can obtain from PROFESSOR LOISETTE? A good memory—the Physiological Art of Never Forgetting—wholly unlike Mnemonics. Any book whatever mastered in one reading.

Prospectuses post free, giving opinions of Mr. RICHARD A. PROCTOR, Dr. ANDREW WILSON, and others who have studied the system.

Great inducements to Correspondence Classes in "Never-forgetting" and for Cure of "Mind-Wandering" in all parts of the world.

Professor LOISETTE, 37, NEW OXFORD STREET, LONDON.

THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

The School will re-open on Tuesday next, September 2nd, at Ten o'clock, and the usual Lectures will commence on Wednesday, September 3rd. Students who intend joining the classes are particularly requested to give immediate notice, the number of entries being already unusually great. Fees for attendance to the October examination, £6 6s.; for attendance to the December examination, £10 10s.; or for the entire session, £21.

For Prospectus apply to

Messrs. LUFF & WOODLAND.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, Gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium, 100 Plants, 5s.

ENGAGEMENTS WANTED.

AS ASSISTANT, in the Colonies. 5 years' experience. Age 23. Apply, F. W., 3, Marine Ter., Walton-on-the-Naze.

AS JUNIOR or DISPENSER to a Surgeon. Can Extract Teeth. Age 22 years. Good references. Apply to H. R. BERINGER, care of J. J. Perkins, Chemist, Lichfield.

AS JUNIOR. Age 22. Height 5ft. 7in. Good address. Can Prescribe and Extract Teeth. London and country experience. Good references. ASSISTANT, 4, Victoria Ter., West Brighton.

AS ASSISTANT. London or suburbs. Age 26. Height 5ft. 9in. Good references. 12 years' experience. Capable of management. Particulars to QUERCUS, 15, Burton Cres., W.C.

AS JUNIOR. In good class of business. Age 22. Height 5ft. 8in. Midlands preferred. WALTER ARNOLD, Shrubbery St., Kidderminster.

AS JUNIOR, in good house. City or West End preferred. 5 years' experience. First-class references. W. R., 186, Richmond Rd., Hackney.

AS ASSISTANT, in first-class Retail and Dispensing business. Age 26. Height 5ft. 10in. Minor qualification. J. W. WATSON, Junr., Tunstall, Staffs.

ENGAGEMENTS WANTED.

AS DISPENSER to Hospital, Surgeon, Chemist, or situation in Wholesale House. Middle aged. Married. Registered. H. A., 101, Wellesley Rd., Croydon, Surrey.

ASSISTANT or Branch MANAGER. Out-door. Single. Age 30. Mixed or select trade. Accurate Dispenser, Prescriber, Teeth Extractor. Varied experience. Postal knowledge. Moderate salary. CHEMICUS, 21, Chapel St., Bridlington Quay.

THE guardians of a youth are desirous of placing him as an in-door APPRENTICE to a Chemist and Druggist. Out of London preferred. Premium moderate. Apply, stating terms, T. L. ELLIOTT, 5, Wellesley Villas, Ashford, Kent.

SURGEON'S ASSISTANT.—Good Bookkeeper, Dispenser. Accustomed to Chemist's Retail. Could assist a Chemist or Surgeon for 10 days from 1st October. C., 39, Leighton Grove, Kentish Town, N.W.

AS ASSISTANT, in a good business. Age 22½. 6½ years' experience. Minor qualification. Good references. F. JOINT, 104, Boutport St., Barnstaple.

AS ASSISTANT in good house in town, with 2 evenings weekly to attend Wills'. Age 22. Height 5ft. 9in. 7 years' experience. Abstainer. Disengaged. HOARE, Sparkford, near Bath.

IN London.—7 years' London and country experience. Can Prescribe, Dispense and Extract Teeth. Abstainer. Excellent references. Age 22. E. C., 15, Prospect St., Barnsley.

AS ASSISTANT in a good Dispensing business in London (West End preferred), with facilities for attending evening lectures. Age 25. First-class references. Disengaged about September 20th. CHEMICUS, J. Green, Chemist, Christchurch.

JUNIOR or IMPROVER.—18 months experience in first-class establishment. Fair knowledge of Dispensing and scientific apparatus. Age 17. Passed Preliminary. Satisfactory reference. W. F. Mc A., 3, Crescent St., Leicester.

A MINOR Student would be willing to give a few hours daily service in exchange for board and lodging. In or near London. CHEMICUS, The Phœnix Inn, Staines.

AS ASSISTANT. Disengaged. Can Extract Teeth. Accustomed to Prescribing and Dispensing. Experienced, with comfortable home. Age 36. Height 5ft. 6in. ALPHA, 67, St. George St., Leicester.

EARLY in October, by two ASSISTANTS. Situations in the same business. First-class Retail and Dispensing. In good Provincial town. Midlands preferred. Ages 26 and 23 respectively. Both possess Minor qualification. Churchmen. T. E. TAYLOR, 84, Victoria Rd., Scarboro'.

PERMANENCY.—5 years' experience, town and country, salary £50, out-door. Good references. Abstainer. Wholesale or Retail. H. J. PASKE, 11, Summer Hill Ter., Bath Rd., Bristol.

ASSISTANT at Retail counter.—Manchester or Liverpool preferred. Age 25. Height 5ft. 9in. Good address. 8½ years' experience. Good references. A. HUTCHINSON, 8, Cartergate, Newark.

AS ASSISTANT, temporary or permanent. Experienced. Disengaged, Age 30. Can Prescribe, Extract Teeth, &c. Good references. E. J., 31, Rumford St., Hulme, Manchester.

AS ASSISTANT or DISPENSER for about 6 weeks in London. S.E. preferred. Excellent references. CHEMICUS, 15, Broadley Ter., Blandford Sq., N.W.

PART time while preparing for Major. West or south London preferred. Terms and particulars to A. P. S., 2, Milton Villas, Newbury, Berks.

ENGAGEMENTS WANTED.

AS Assistant, in London. Near Wills' preferred, with time to attend evening classes. Age 32. Long experience. Good references. Rhei, 2, Sedgwick Pl., Gateshead-on-Tyne.

QUALIFIED Assistant. Age 25. First-class reference. Desires engagement in a good business house. Cutting trade not objected to. Viola, 19, Inworth St., Battersea, S.W.

AS Junior in good class business. Age 21. London preferred. Accustomed to Dispensing, light Retail, and Dentistry. J. King, 176, Portobello Rd., Notting Hill, W.

IN a Dispensing business. Small salary accepted. Dispensing experience required. Country preferred. 21 years of age. 5ft. 8in. in height. 3½ years' experience. M., Market Hill, Luton.

WHOLESALE at Wet, Dry, or Export counters. 3 years' good experience with large city firm. Permanency required. Age 27. Disengaged September 6th. Excellent references. Alpha, 60, Saltoun Rd., Brixton.

AS Manager of Branch, Open Surgery, Dispensary or Hospital. Minor and Hall qualification. 16 years' London and country experience. Age 33. Married, no family. Manager, 36, Stainsby Rd., Poplar, E.

AS Assistant, about the end of September. Age 22. Height 6ft. 2in. 6 years' experience. Good references. W. J. Barber, 137, High St., Croydon.

Also to Apprentice immediately, a well educated and gentlemanly Youth, to a Chemist, with a comfortable home and every opportunity of learning the business. Premium moderate. W. J. Barber, 137, High St., Croydon.

AS Junior in a good class business. Country preferred. 4 years' experience. Age 19½. Height 5ft. 7in. R. P., Eagle Brewery, Waltham Abbey, Essex.

ASSISTANTS WANTED.

A SENIOR Assistant, for the Retail counter. Mixed country business. Out-door. Give full particulars and references in first letter. Kemp & Son, Horncastle.

IMPROVER.—J. Smith, Chemist, High Barnet, will have a vacancy for an Assistant on September 12th. A gentleman studying for the Minor preferred. From 2 till 5, or its equivalent, being allowed for study or recreation in lieu of part salary. If possible enclose photo, to be returned.

AT once.—A respectable young man, who can be well recommended, as Assistant in a good country business. Apply, stating age, references, and salary expected, to G. J. Cottrill, Shepton Mallet.

GENTLEMANLY Junior or Improver. Passed Preliminary preferred. Mixed country business. Send carte, to be returned. J. W. Lasham, Romford.

FOR South Africa.—A competent young man as Chemist's Assistant. Apply by letter only, stating age, qualification, &c., to E. C., care of Davy, Yates & Routledge, 64, Park St., Southwark, S.E.

BY the 15th September.—In a first-class Dispensing and Family business, 7 miles from town, an Assistant, not under 23 years of age. Salary £40 per annum. In-doors. Address, stating age and reference from last employer, M., care of Messrs. Barron, Squire & Co., Bush Lane, Cannon St., London, E.C.

APPRENTICE.—A vacancy occurs for a well educated youth in an old established business. Time allowed for study and recreation. Moderate premium required. A comfortable home ensured, and every opportunity given for acquiring a thorough knowledge of the business. Address, R. S. P., 186, Essex Rd., Islington, London, N.

ASSISTANTS WANTED.

SHORTLY.—A competent, obliging and gentlemanly Assistant, possessing legal qualification, in a first-class business where several Assistants are kept. Address, H. M. E., care of Meggeson & Co., Miles Lane, Upper Thames St., London, E.C.

A TRUSTWORTHY, energetic Assistant, with country experience, for the Retail in a good Mixed Agricultural business. Lincolnshire. A married man requiring a permanency would be treated with. No Sunday duty. To commence at £80. State age, height, experience, and send photo. First-class references indispensable. Address, in first instance, A. B., Messrs. Wright, Layman & Umney, 50, Southwark St., London.

A STEADY respectable young man as Junior, for a light Retail and Prescribing business. Age from 20 to 23. One only kept. To one reading for the Minor, time could be arranged for study, &c. Apply to F. W. Sandy, 390, Walworth Rd., S.E.

AN Assistant (Minor preferred), about 22 years of age, for a good class business, 10 miles from London. Must be well up in Dispensing. Salary to commence at £40. Apply, with full particulars, and enclose photo., to W. Wade, Chemist, Sidcup, Kent.

JUNIOR Assistant or Improver. Immediately. For a light Retail and Dispensing business. Apply, with full particulars, to A. B., care of Southall & Co., Birmingham.

AN Assistant, for a first-class country business. In-doors. Send full particulars, stating salary required, &c. If convenient enclose carte (which will be returned), to G. B, Messrs. Barron, Harveys & Co., Giltspur St.

A COMPETENT Assistant, out-door, early in October. Accustomed to good class Retail and Dispensing. Not under 22 years of age. No Sunday duties. Apply, stating age, salary required, references, &c., to J. J. Giles, Chemist, Folkestone.

A YOUNG man, who would be disposed to go to Jamaica, as Druggist's Assistant. He must be prepared with the best references, both as regards business knowledge and general character. Apply to Josiah Messer, Esq., 49, Berners St., Oxford St., W., or to Park, Macfadyen & Co., 25, Lime St., E.C.

R. HUMPHREYS, 12A, Upper Belsize Ter., N.W., near the Swiss Cottage Railway Station, is in want of a good Junior. Minor qualification. London reference, and personal interview preferred.

JUNIOR Assistant, for a good class Retail and Dispensing business. Time for study if required. Apply, stating usual particulars to Fredk. T. Shepley, 169, Brockley Rd., S.E.

A COMPETENT Assistant, about 24, for a good class Dispensing business. State height, salary required, with all particulars. Please enclose photo., which will be returned. Apply to Mr. Blades, 10, Gloucester Rd., South Kensington, S.W.

A JUNIOR Assistant, out-door, for a Mixed country business. Must be an accurate Dispenser. Apply, stating experience and salary required, to Cox & Robinson, Stony Stratford.

PARENTS and Guardians.—A respectable educated youth as an Apprentice to a good Mixed country business. Work light. Comfortable home. A Major or Minor Assistant kept. Premium nominal. A turnover Apprentice would not be objected to. Apply to Mr. T. Randall, Pharm. Chemist, Wareham, Dorset.

A THOROUGHLY competent Senior Assistant Must be quick, well experienced in Dispensing, and a good Counterman. Apply to W. Thomas, 103, Talbot Rd., Bayswater.

ASSISTANTS WANTED.

ASSISTANT (Junior) for better class country market town business. Must be neat and accurate Dispenser, of good address, and willing to make himself useful. Good home comforts offered. Apply, E. BENNETT, High St., Ledbury.

GOOD Dispensing ASSISTANT, about 23 years, by September 20th. For suburban branch, near principal shop, and superintended by principal. Must possess good references as to ability and character. Salary £45. Address, SMITH, Pharmaceutical Chemist, 169, Rice Lane, Walton, Liverpool.

IMMEDIATELY.—A steady JUNIOR with some experience, or an ASSISTANT requiring part of the day for study, in a select London Retail. Address, with particulars of salary required, references, and when disengaged, PHARMACIST, Sanger & Sons, 489, Oxford St., W.

EXPERIENCED and trustworthy ASSISTANT for Retail counter. Must be good Prescriber. Out-door and no Sunday duty. State full particulars and enclose photo., to W. P., 8, St. Paul's Sq., Southsea.

JUNIOR ASSISTANT. Immediately. For a seaport town. Age about 20. Out-door. State salary required and all particulars, to CHEMICUS, care of Messrs. Barron, Squire & Co., Bush Lane, Cannon St., London.

IMMEDIATELY.—A Junior ASSISTANT of good address and accustomed to a Dispensing business. Apply to J. GARNER, 119, High St., Kensington, W.

IMMEDIATELY.—A competent ASSISTANT. 3 kept. Must be well up in Dispensing and general Retail. Please enclose carte, and state age, height, and salary required, to BAKER & WRIGHT, Chelmsford.

A COMPETENT ASSISTANT. Minor qualification. Must be a quick and accurate Dispenser, and accustomed to a good country business. Progressive salary and comfortable home. Junior kept. Apply, enclosing carte (to be returned), to JOHN RAE, Newmarket.

ASSISTANT for the West Indies. Accustomed to Prescribe. State qualifications, previous engagements, and salary required, to D., care of Schrader & Co., 31, St. Mary Axe, E.C.

AN ASSISTANT for Newcastle-on-Tyne. Out-door. Must be a reliable Dispenser and good Salesman. An exceptional situation for suitable young man. Address application with full particulars, to NEWCASTLE, care of Messrs. Southalls & Barclay, Birmingham.

AN ASSISTANT, age 21 or 22, for good-class Dispensing and light Retail. One possessing some knowledge of Postal duties preferred. Applicants will please send full particulars, stating height, salary and references. J. T. NEWEY, Chemist, Beulah Hill, Norwood, S.E.

MESSRS. ARGLES & STONHAM, Maidstone, have a vacancy for a Junior ASSISTANT. Work principally in the Wholesale. Apply by letter, stating age, qualification, and salary required.

ENERGETIC ASSISTANT. Age not under 22 or 23. Apply, with reference to last employer. Send photo. (if convenient), height and salary required, to R. N. KIDDLE, Bideford, N. Devon.

A JUNIOR ASSISTANT, for a Mixed country business. Apply, stating salary required, &c. W. H. JONES, Chemist, Mountain Ash, South Wales.

AT once.—An ASSISTANT for 2 or 3 weeks. State full particulars and terms, to F. H. FRESSON, Dispensing Chemist, 61, New Rd., Southampton. A vacancy for an APPRENTICE.

AS JUNIOR or DISPENSER, in a good country business. One accustomed to the Oil and Colour trade preferred. A Senior kept, and no Sunday duty. C. WOODS, Harleston, Norfolk.

ASSISTANTS WANTED.

JUNIOR ASSISTANT required by Surgeon and Pharmaceutical Chemist. Nominal salary. Plenty of time for study. Suit a chemist wishing to enter medical profession. Would direct studies for Minor student. J. W. D., 59, Barnsbury Rd., N.

JUNIOR ASSISTANT, who understands Post Office and Single Needle. Must be a neat Dispenser and have good recommendation. Apply to MANAGER, 50, Queen's Rd., Brighton.

IMMEDIATELY.—An in-door ASSISTANT of good ability and address, about 23 years of age. Apply, stating references, salary, &c., to Mr. WISE, 43, Duke St., Manchester Sq., W.

BUSINESSES FOR DISPOSAL.

BRIGHTON.—Established 1833. Chemist and Druggist's BUSINESS, in the best and busiest part. Rent only £70. Good living house attached. Price for long and valuable lease, goodwill, stock, fittings, and fixtures, 250 guineas. Owner retiring. Address, HARCOURT, MILLS & Co., Auctioneers and Business Transfer Agents, 79, King's Rd., Brighton.

CHEMISTS and Dentists.—A good class Retail, Dispensing and Prescribing BUSINESS. Established 8 years. In an increasing neighbourhood. Handsome shop. First-class situation. Must be disposed of through ill-health. Now under management. Could be rapidly increased by an energetic man. Price £350. Address, CHEMICUS, 6, Abney Park Ter., Stoke Newington, N.

A FIRST class Dispensing and Family Retail BUSINESS. Situate in one of the best suburbs of Manchester. Returning under management just on £800. Profits nearly one half. Shop beautifully fitted up. Old established. Lease. Price £650. Apply, T. & D., care of James Woolley, Sons & Co., Manchester.

SUBURBAN cash BUSINESS, in Kent. Through ill health. Opposite busy station in thickly populated neighbourhood. Shop recently and elegantly fitted by Treble. Good opening for Dentist. Returns 1882, £60; 1883, £64; 1884, £67 per month, and admitting of greater increase. Lease. Rent £50. BETA, Mr. Sharrah, 5, Bennerley Rd., Wandsworth.

N.W.—A steadily increasing BUSINESS. Main thoroughfare. Tram, 'bus and train. Dense neighbourhood. Rent £40 per annum; nearly cleared. Long lease. Well fitted and stocked. A good living. Price about £160. Apply, B. Z., care of Messrs. Hearon & Co., 5, Coleman St., City, E.C.

A WELL established Chemist's light RETAIL, opposite an important Station, with enormous traffic, on the G. E. Railway. Good middle class neighbourhood. Present receipts now averaging over £14 weekly, and rapidly increasing. About 16 years lease to run, at very low rental. Net profit £8 or £9 weekly, and profitable Post Office attached. Apply, in first instance, A. A. B., Garman Bros., 278, Roman Rd., Bow, E.

LONDON (suburbs).—Thorough genuine light Retail, Dispensing, and Family BUSINESS. Returning £700, and increasing. Profitable, and capable of extension. Several Proprietary Articles, which have a good sale. The business will bear the strictest investigation. Satisfactory reasons for disposal. House (corner) large. Good garden. W. E., 14, Compton St., Derby.

IN large Manufacturing town, in Yorkshire.—An old established BUSINESS. Returns about £1000, from Dispensing, Prescribing, general Retail, and several good Proprietary Articles. Owner has another business that requires his whole attention. Apply, D. L. Y., care of Barron, Harveys & Co., Giltspur St., London, E.C. Agents' applications will not be answered.

ENGAGEMENTS WANTED.

AS Assistant, in London. Near Wills' preferred, with time to attend evening classes. Age 32. Long experience. Good references. Rhei, 2, Sedgwick Pl., Gateshead-on-Tyne.

QUALIFIED Assistant. Age 25. First-class reference. Desires engagement in a good business house. Cutting trade not objected to. Viola, 19, Inworth St., Battersea, S.W.

AS Junior in good class business. Age 21. London preferred. Accustomed to Dispensing, light Retail, and Dentistry. J. King, 176, Portobello Rd., Notting Hill, W.

IN a Dispensing business. Small salary accepted. Dispensing experience required. Country preferred. 21 years of age. 5ft. 8in. in height. 3½ years' experience. M., Market Hill, Luton.

WHOLESALE at Wet, Dry, or Export counters. 3 years' good experience with large city firm. Permanency required. Age 27. Disengaged September 6th. Excellent references. Alpha, 60, Saltoun Rd., Brixton.

AS Manager of Branch, Open Surgery, Dispensary or Hospital. Minor and Hall qualification. 16 years' London and country experience. Age 33. Married, no family. Manager, 36, Stainsby Rd., Poplar, E.

AS Assistant, about the end of September. Age 22. Height 6ft. 2in. 6 years' experience. Good references. W. J. Barber, 137, High St., Croydon.

Also to Apprentice immediately, a well educated and gentlemanly Youth, to a Chemist, with a comfortable home and every opportunity of learning the business. Premium moderate. W. J. Barber, 137, High St., Croydon.

AS Junior in a good class business. Country preferred. 4 years' experience. Age 19½. Height 5ft. 7in. R. P., Eagle Brewery, Waltham Abbey, Essex.

ASSISTANTS WANTED.

A SENIOR Assistant, for the Retail counter. Mixed country business. Out-door. Give full particulars and references in first letter. Kemp & Son, Horncastle.

IMPROVER.—J. Smith, Chemist, High Barnet, will have a vacancy for an Assistant on September 12th. A gentleman studying for the Minor preferred. From 2 till 5, or its equivalent, being allowed for study or recreation in lieu of part salary. If possible enclose photo, to be returned.

AT once.—A respectable young man, who can be well recommended, as Assistant in a good country business. Apply, stating age, references, and salary expected, to G. J. Cottrill, Shepton Mallet.

GENTLEMANLY Junior or Improver. Passed Preliminary preferred. Mixed country business. Send carte, to be returned. J. W. Lasham, Romford.

FOR South Africa. — A competent young man as Chemist's Assistant. Apply by letter only, stating age, qualification, &c., to E. C., care of Davy, Yates & Routledge, 64, Park St., Southwark, S.E.

BY the 15th September.—In a first-class Dispensing and Family business, 7 miles from town, an Assistant, not under 23 years of age. Salary £40 per annum. In-doors. Address, stating age and reference from last employer, M., care of Messrs. Barron, Squire & Co., Bush Lane, Cannon St., London, E.C.

APPRENTICE.—A vacancy occurs for a well educated youth in an old established business. Time allowed for study and recreation. Moderate premium required. A comfortable home ensured, and every opportunity given for acquiring a thorough knowledge of the business. Address, R. S. P., 186, Essex Rd., Islington, London, N.

ASSISTANTS WANTED.

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AS JUNIOR or DISPENSER, in a good country business. One accustomed to the Oil and Colour trade preferred. A Senior kept, and no Sunday duty. C. WOODS, Harleston, Norfolk.

ASSISTANTS WANTED.

JUNIOR ASSISTANT required by Surgeon and Pharmaceutical Chemist. Nominal salary. Plenty of time for study. Suit a chemist wishing to enter medical profession. Would direct studies for Minor student. J. W. D., 59, Barnsbury Rd., N.

JUNIOR ASSISTANT, who understands Post Office and Single Needle. Must be a neat Dispenser and have good recommendation. Apply to MANAGER, 50, Queen's Rd., Brighton.

IMMEDIATELY.—An in-door ASSISTANT of good ability and address, about 23 years of age. Apply, stating references, salary, &c., to Mr. WISE, 43, Duke St., Manchester Sq., W.

BUSINESSES FOR DISPOSAL.

BRIGHTON.—Established 1833. Chemist and Druggist's BUSINESS, in the best and busiest part. Rent only £70. Good living house attached. Price for long and valuable lease, goodwill, stock, fittings, and fixtures, 250 guineas. Owner retiring. Address, HARCOURT, MILLS & Co., Auctioneers and Business Transfer Agents, 79, King's Rd., Brighton.

CHEMISTS and Dentists.—A good class Retail, Dispensing and Prescribing BUSINESS. Established 8 years. In an increasing neighbourhood. Handsome shop. First-class situation. Must be disposed of through ill-health. Now under management. Could be rapidly increased by an energetic man. Price £350. Address, CHEMICUS, 6, Abney Park Ter., Stoke Newington, N.

A FIRST class Dispensing and Family Retail BUSINESS. Situate in one of the best suburbs of Manchester. Returning under management just on £800. Profits nearly one half. Shop beautifully fitted up. Old established. Lease. Price £650. Apply, T. & D., care of James Woolley, Sons & Co., Manchester.

SUBURBAN cash BUSINESS, in Kent. Through ill health. Opposite busy station in thickly populated neighbourhood. Shop recently and elegantly fitted by Treble. Good opening for Dentist. Returns 1882, £60; 1883, £64; 1884, £67 per month, and admitting of greater increase. Lease. Rent £50. BETA, Mr. Sharrah, 5, Bennerley Rd., Wandsworth.

NW.—A steadily increasing BUSINESS. Main thoroughfare. Tram, 'bus and train. Dense neighbourhood. Rent £40 per annum; nearly cleared. Long lease. Well fitted and stocked. A good living. Price about £160. Apply, B. Z., care of Messrs. Hearon & Co., 5, Coleman St., City, E.C.

A WELL established Chemist's light RETAIL, opposite an important Station, with enormous traffic, on the G. E. Railway. Good middle class neighbourhood. Present receipts now averaging over £14 weekly, and rapidly increasing. About 16 years lease to run, at very low rental. Net profit £8 or £9 weekly, and profitable Post Office attached. Apply, in first instance, A. A. B., Garman Bros., 278, Roman Rd., Bow, E.

LONDON (suburbs).—Thorough genuine light Retail, Dispensing, and Family BUSINESS. Returning £700, and increasing. Profitable, and capable of extension. Several Proprietary Articles, which have a good sale. The business will bear the strictest investigation. Satisfactory reasons for disposal. House (corner) large. Good garden. W. E., 14, Compton St., Derby.

IN large Manufacturing town, in Yorkshire.—An old established BUSINESS. Returns about £1000, from Dispensing, Prescribing, general Retail, and several good Proprietary Articles. Owner has another business that requires his whole attention. Apply, D. L. Y., care of Barron, Harveys & Co., Giltspur St., London, E.C. Agents' applications will not be answered.

BUSINESSES FOR DISPOSAL.

IN one of the largest towns on the East Coast.—A good Retail and Dispensing BUSINESS. The situation is unexceptional and rent moderate. Satisfactory reasons for leaving. For terms and card to view apply to GRIMWADE, RIDLEY & Co., Wholesale Druggists, Ipswich.

A GOOD class Retail, Dispensing and Prescribing BUSINESS. Position is undeniably good, in a rising neighbourhood. Good house at a very moderate rental. Proprietor taking a large business in another line. Price £550. Address, M. DADE, 3, Noyua Rd., Upper Tooting, Balham, S.W.

MESSRS. HINE GILBERT want a purchaser for high class Dispensing BUSINESS, situate in fashionable Watering-place. Returns (proof) over £3000 annually. Handsomely fitted. Low rent. Price year's returns. FASHIONABLE SUBURB. Increasing returns of £5 weekly. Rent could more than let off. Price £150. Apply, 17, Hart St., Bloomsbury Sq.

MESSRS. GURDEN BERDOE have for transfer:—NORFOLK. Old established Mixed country business. Returning £1200. Very profitable. Rent £40. Good house. Large garden. £900. NOTTINGHAMSHIRE. Retail and Prescribing trade. Returning £30 cash weekly. Best position in town. £1000. BRISTOL. Retail Prescribing and Dispensing trade. Returning £400. Profits 75 per cent. For £350. GLOUCESTERSHIRE. Light Retail and Dispensing. Returning £600. Same hands 18 years. £500. Part remain. SUSSEX (close to sea). Elegantly fitted first-class Dispensing trade. Splendid house. Returning £750. HERTS. Retail and Dispensing. Returning £450. Rent £26. £350. ESSEX. Same hands 30 years. Selling through infirmity. Returns average £542. Reasonable offer entertained. LONDON, W. Main thoroughfare. Well fitted. Returning £950. Leaving England. To sell, £350. N. Corner Retail and Dispensing trade. Returning £700. Excellent house and garden. KILBURN. Unopposed. Well fitted. Returning £5 weekly. For £160. CRYSTAL PALACE (near). Well fitted Retail. Returning £7 weekly. £165. 12 miles out N.W. Retail, Prescribing and Dispensing. Returns £400. Good house. Splendid garden. £275. Others from £100 to £4000. Unopposed. Apply, 30, Jewry St., Aldgate.

Chemists' Shop Fittings—Drawers—Counters—Counter Show Cases—Wall Cases—Window Enclosures—Stoppered Shop Rounds—Carboys, &c.

ONE range of 66 new best make pine fronted Drawers, 12 ft. long, with gold labels and glass knobs, with lockers under and shelving and cornice over, price £10 8s. One range as above, 18 ft. long, price £15 12s. 6d. One second-hand Counter, 6 ft. long, panelled and painted mahogany, 30s. One 6 ft. Counter, Spanish mahogany top, 55s. One second-hand Counter, 8 ft. long, painted black and gold, price 40s. One large handsome mahogany Dispensing Screen, with tablet "Dispensing Department" in centre and glass case on each end, total length 7½ ft., price £7. Second-hand mahogany Desk, with drawer below flap, 15s. One ditto, with drawers inside, 12s. 6d. One new mahogany bent front Case, 6 ft. 4 in. long, with mirrors in doors at back, 100s. One new pine Wall Case, 6 ft. long, 8½ ft. high, price £7 10s. One large mahogany Dispensing Screen, with mirror centre and marble slab, total length 9 ft., price £9. One Soda Water Stand, painted walnut and gold, with new marble slab, 35s. A lot of Glass Casing for front of counters, cut to suit purchasers. One handsome mahogany Window Enclosure, 10 ft. long, with gas fittings complete, price £7. 72 best 20 oz. new W. & N. M. Stoppered Rounds, labelled, price 70s. 100 ditto, 95s. 48 40 oz. ditto, 60s. Lot of 3 lb. white Ointment Jars, labelled, 20s. per doz. One 24 5 grain Pill Machine (second-hand), 7s. 6d. Address, R. TOMLINSON, 15, St. Paul's Square, Birmingham.

FOR SALE.

A SPLENDID pair Specie Jars, on ebonised and gilt stands, extreme heighth 36 inches; other sizes in stock; 2 pair swan neck Carboys and stands; a quantity of large pear-shape ditto; Shop Rounds, blue and white Ointment Jars and Pots, Jujube Jars, and other fancy jars; 24-3, 4, and 5 grain Pill Machines, equal to new; Wall Case, as Maw's fig. A 88; a 12ft. Wall Case; small Dental Case, with specimens; outside Globe Lamp; Sponge Cases, A 41, A 42; a 12ft. Fixture, as Maw's fig. A 84; 2ft. long, 4ft. long, 6ft. long, 8ft. long, 12ft. long mahogany fronted Drawers, glass knobs, glass labels (bevelled edge), with lockers for bottles under, 4ft. high. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

DISPENSING Screen, 5ft. 6in., with counter under, fitted with drawers and plate glass cases in front, a bargain; Dispensing Screens, 5ft., 6ft., 7ft., glass case at each side, with silvered plate-glass centre, with marble slab in front, with carved wood on top, 3ft. high, the cases at each side have plate-glass doors, with tablets on top, 2ft. high, inside each case fitted with silvered glass and shifting shelves; as fig A 53, 5ft. 6in. long, 7ft. 6in. long; as fig. A 54, 4ft. long; as fig. A 55, 5f., 6ft., 7ft. 6in. long; Sponge Case, A 43; a Centre Case, 8ft. long, 5ft. wide, mahogany; a number of other size Screens and Cases, very cheap. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

FOR Sale. Plate-glass Counter Cases, as fig. A 2, 3ft. long, 4ft. long, 4ft. 6in. long; as fig. A 3, 3ft. long, 3ft. 6in. long; A 6, 4ft. long, 5ft. long, 6ft. long; as fig. A 7, 3ft. 6in. long, 6ft. long; as fig A 8, 5ft. long, 6ft. long; as fig. A 9; as fig. A 13, 4ft. long, 4ft. 6in. long; A 5, 6ft. 6in. long; A 16, 3ft., 3ft. 6in., 4ft. long; A 17, 4ft. long, 4ft. 6in. long; A 18, 5ft. long, 6ft. long, 7ft. 6in. long, 8ft. long, 9ft. long; Tooth Brush Case, A 9, A 10; Desk and Cases, as fig. A 30, 2ft. 6in. long, and 3ft. long, as fig A 31; Cigar Cases, A 34. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

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Subscription Lists for the Share Capital will be opened in the course of September. Applications for Shares will be considered in the order in which they are received.

London: Printed by William Inglis Richardson, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. Churchill, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 741.] SATURDAY, SEPTEMBER 6, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
The Galenical Pharmacy of the New Pharmacopée Française	181
Fluid Extract of Camellia. By Dr. Squibb	183
Fluid Extract of Green Coffee. By Dr. Squibb	185
Seeds of Abrus Precatorius	186
EDITORIAL ARTICLES AND NOTES:—	
Pasteur on Inoculation against Rabies	187
Notes:—A Proposed Extra Pharmacopœia List—Conference Photographs—Forest Industry	188
BRITISH PHARMACEUTICAL CONFERENCE:—	
Standardizing of Pharmaceutical Preparations. By G. F. Schacht	189
Standardized Pharmaceutical Preparations. By D. B. Dott, F.R.S.E.	190
A Fossil Aloe from the Wealden. By G. A. Keyworth, F.C.S.	193
Hymenodictyonine, an Alkaloid from Hymenodictyon Excelsum. By W. A. H. Naylor, F.C.S.	195
Note on the Filtration of Lard. By W. Willmott	196
The Composition of Seidlitz Powders. By William Martindale	199
CORRESPONDENCE:—	
Estimation of Spirit of Nitrous Ether	200
Permanganate of Potash Pills	200
Answers to Correspondents	200

Pharmaceutical Society of Great Britain.

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, October 1st, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely.*

The Sessional Prizes and Certificates will be distributed at this Meeting. An Address to the Students will be delivered by

W. T. THISELTON DYER, C.M.G., M.A., F.R.S., F.L.S.,
Assistant Director of the Royal Gardens, Kew.

All Students and Friends, ladies as well as gentlemen, are invited to be present.

LIBRARY AND MUSEUM.

SPECIAL NOTICE.

The Library and Museum will not be open in the evening during September.

The Library and Museum will be closed from September 1st to September 13th, both dates inclusive, for revision.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

NORTH BRITISH BRANCH.

The Society's Rooms at 119A, George Street, Edinburgh, will be closed from and after Saturday, August 16th, and the new premises at 36, York Place, Edinburgh, will be opened on Wednesday, October 1st.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

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OF THE

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FORTY-THIRD SESSION, 1884—85.

CHEMISTRY AND PHARMACY..... Professor REDWOOD and Mr. DUNSTAN.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratories.

At 8 p.m. on Wednesday, October 1st, the School Prizes will be distributed and an Address to the Students will be delivered by W. T. THISELTON DYER, C.M.G., M.A., F.R.S., F.L.S., *Assistant Director of the Royal Gardens, Kew. All Students and Friends, ladies as well as gentlemen, are invited to be present.*

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3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects are fully illustrated with experiments, diagrams and specimens, and examinations of the class are held on those subjects which have been previously treated of in the lectures.

Additional lectures upon Chemistry and Physics are also delivered by Mr. Dunstan during the course.

The class in Practical Dispensing and the Reading of Prescriptions is conducted by Mr. Joseph Ince, and meets twice a week at 5 p.m.

THE LECTURES ON
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Comprise the following subjects:—

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2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures are fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *viva voce* examination is held after each Lecture. It is expected that all pupils will attend these examinations.

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Is conducted in the Laboratories by the Professor and Demonstrators. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date.* A Junior course occupies about five months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and is dated from the day of entry to that day twelvemonth.

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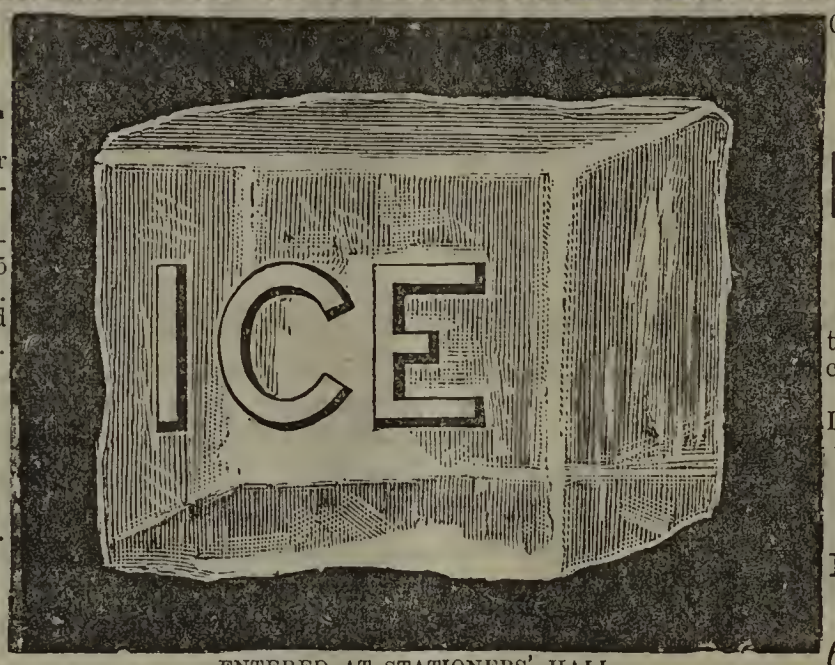

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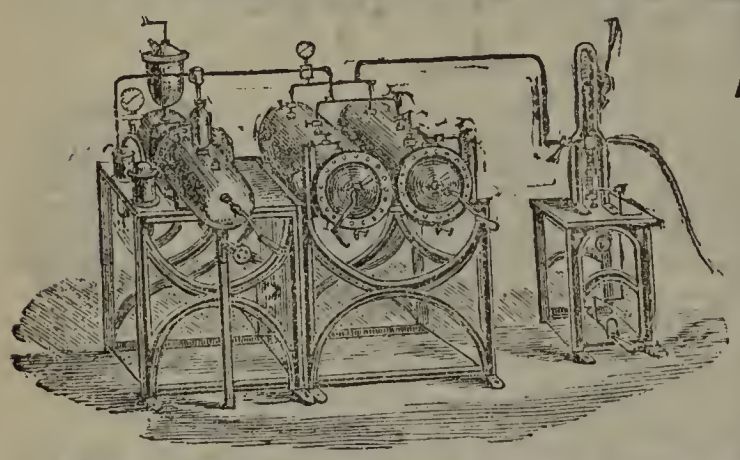

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56 over proof, 19/7 net, prompt Cash, for 5 gallon quantities; also Finest Orange Wine and Sherry for medicinal purposes.

CALE STREET DISTILLERY, LONDON, S.W.

Duty free for Exportation—also best Methylated Spirit at lowest prices.

PHARMACEUTICAL PREPARATIONS & CHEMICALS.

HENRY AYSCOUGH THOMPSON & SON,

WHOLESALE & EXPORT DRUGGISTS,

22, WORSHIP STREET, FINSBURY SQUARE, LONDON.

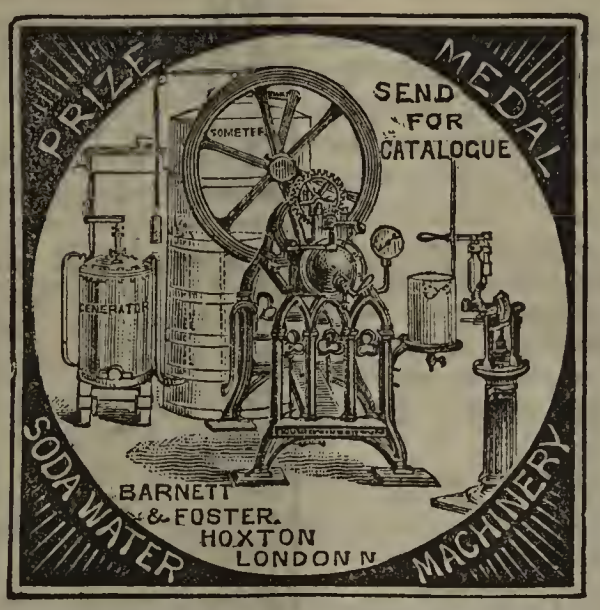
SOLE MAKERS OF LIQ. SENNÆ DULC. & LIQ. RHEI DULC. (MOIR'S).

SODA WATER MACHINERY AND ALL APPLIANCES

FOR THE MANUFACTURE OF THE HIGHEST CLASS OF

SODA, POTASS, SELTZER, CARRARA, LITHIA, MAGNESIA, AND TONIC WATERS, &c.

Prize Medals:
London, 1862, 1873, 1874;
Vienna, 1873; Philadelphia, 1876;
Four First Class Certificates and
Prize Medals, Calcutta, 1884;



LEMONADE, GINGER BEER OR ALE, ORANGEADE, NECTAR, CHAMPAGNE CIDER, FRUIT CHAMPAGNE, &c.

Prize Medals:
Cape, 1877; Paris, 1867, 1878;
Highest Award, Sydney, 1879-80.

The Chemist who enters into the enterprise of manufacturing Aërated Drinks (with properly-constructed Machinery) in any districts where they are required, renders a real service to the public, and no business offers him a better return for a comparatively small outlay.

Our Machines are universally adopted throughout the world for the manufacture of all kinds of Aërated Drinks, whether in bottles, syphons, or counter fountains. There are in England alone over 2,000 factories where our Machinery is in use. They are the simplest, safest, and cheapest for the purpose, and produce a highly charged gaseous water free from metallic or foreign contamination.

All our Machines have a Gasometer, and it forms a most important necessity where purity of product is required, as in this the gas is expanded and purified; it also removes the possibility of accidents by explosion, and avoids the necessity of complication—these we consider of greater importance than the saving of a few inches of floor space.

No. 1, to make	700	doz.	Botts.	per	day	...	£70	0	0	Bottling Apparatus for Corked Bottles ...	£9	9	0
No. 2, „	500	„	„	„		...	65	0	0	„ „ for Patent Bottles, with Syrup Pump ...	10	10	0
No. 3, „	400	„	„	„		...	60	0	0				
No. 4, „	300	„	„	„		...	55	0	0	„ „ with Syrup Pump for Champagne Bottles...	20	0	0
No. 5, „	200	„	„	„		...	50	0	0				
No. 6, „	100	„	„	„		...	30	0	0	„ „ with Syrup Pump for Syphon Bottles ...	14	14	0

These are the same for any size Machine.

The above quantities are for Lemonade and other Saccharine Drinks; if for Splits, reckon double; if for a very highly charged Soda Water, reckon half.

These Machines are all packed without taking apart, and can be set to work immediately on arrival. Many of our Machines have been in constant use for forty years without requiring any repairs. Recipes and every information given for manufacturing all the above Drinks, so that the most inexperienced can at once produce Waters of the highest class. **Inventors of Fruit Champagne. Sample Case, containing 1 dozen, forwarded for 6s. 6d.**

OBSERVE!!—It is important that the Machines for the manufacture of Aërated Water should be of the very highest class, to produce the best results; and it is ill-timed economy to be tempted into buying cheap and worthless machinery, which is liable to get out of order soon, besides making very indifferent Waters. Purchasers must not overlook the fact that Soda Water Machines, like watches, can be made at any price.

THE "LONDON-MADE" SYPHON BOTTLE.

PRICES:

Quart size, 22s. per doz. } *by the gross.*
Pint „ 21s. „ }

No charge for packing if ordered in Bin Cases, 2s. 6d. each, holding 1 dozen.

The high reputation this bottle has achieved is due to the fact of its being in every particular the most perfect yet introduced, and when compared with others in the market it stands pre-eminent. It is the most simple in its working parts, therefore the least liable to get out of order; it is the most easily opened, the lightest pressure on the handle being sufficient; it produces a more highly charged gaseous water than is usually obtained from syphons; it compares most favourably in appearance with any, and the metal top being entirely free from lead, the prejudice against syphon drinks is at once removed, as the liquid passes over pure tin only.

ILLUSTRATED CATALOGUE FORWARDED FREE.

SOLE AGENTS FOR CODD'S PATENT BOTTLES—THE BEST FOR AËRATED WATERS.

BARNETT & FOSTER,

25N, EAGLE WHARF ROAD, NEW NORTH ROAD, LONDON, N.

TASTELESS PILLS

(COX'S PATENT.)
Dated and Sealed April 13, 1854.

Chemists selling TASTELESS PILLS *have an advantage over others neglecting to do so.*

We strongly recommend our Aperient Pills at 6s. and Compound Rhubarb at 7s. per pound, coated, as saleable Pills. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. in the Shilling will be allowed if Stamps or P.O.O. are remitted with order.

Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

The Registrar of Trade Marks (after giving the usual public notice prescribed by Parliament to allow of opposition) has granted us the above "Trade Mark," thus officially recognising us as the "ORIGINAL MAKERS OF TASTELESS PILLS," and no pills will be sent out without this mark on all bottles or packages.

Any Formulæ Dispensed, Covered, and Estimates given.

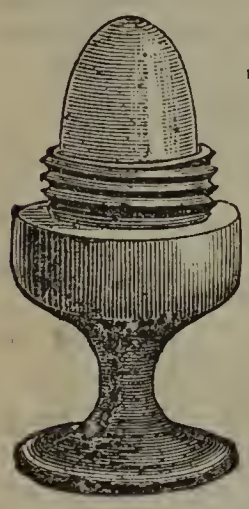
Samples, with a list of pills from upwards of 500 different forms which are kept in stock, will be forwarded free on application.

ARTHUR H. COX & CO. *Tasteless Pill Manufacturers,* **Brighton.**

PURE MENTHOL CONES,

A REMEDY FOR

Headache, Neuralgia, Rheumatism, &c.



SPECIALITY BOXES.

The lids remove, and the box serves as a holder for the Cone.

Fancy Hardwood Boxes, 7s. per dozen.

Plain Willow Boxes, 3s. 6d. per dozen.

N.B.

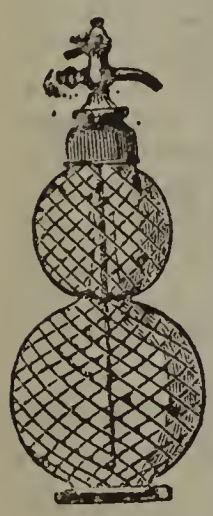
Prices Reduced to 7/- and 3/6 per doz. *for the Pure Menthol Cones* (exempt under the Act).

Show Cards and Counter Bills on application.

T. CHRISTY & CO., 155, Fenchurch St., London

Proprietors of MYOCOM FLY GUM, *in tins at* 1/-, 2/6 *&* 5/- *each.*

EUGENE GERAUT & CO.'S
New Patent Lever Seltzogenes



Wholesale Prices as follows:—

3-pint, wire 13s. 0d. | 5-pint, wire 18s.
3-pint, cane 13s. 6d. | 5-pint, cane 19s.
8-pint, wire, 30s.; cane, 32s.
3-pint size, strongly silver-plated, richly decorated Porcelain stands .. .. .. each 30s.
5-pint ditto . 38s. | 8-pint ditto . 48s.

IMPORTANT NOTICE!

For orders of three, 15 %. Large discount allowed off quantities upwards. Strongly silver-plated top, 5s. extra.

Powders for the above.

3-pint size in handsome labelled boxes	12 Charges Per doz. Boxes.	10 Charges Per doz. Boxes.
5-pint do. do.	21s.	18s. 6d.
8-pint do. do.	30s.	26s. 0d.
	51s.	44s. 6d.

Liberal Discount.

WHOLESALE PRICES FOR SYPHONS.

Clear or coloured glass, viz., red, blue, green, or yellow, warranted pure ENGLISH BLOCK TIN TOPS, with piston or cap, 22s. 6d. *per dozen or* £13 10s. *for quantities of not less than one gross.* PACKING IN CASK 5s. PER GROSS. The Name marked on the metals free of charge for quantities of not less than one gross. The Name engraved on the glass with Trade Mark, 1s. 6d. and 2s. per dozen extra. Catalogue on application.

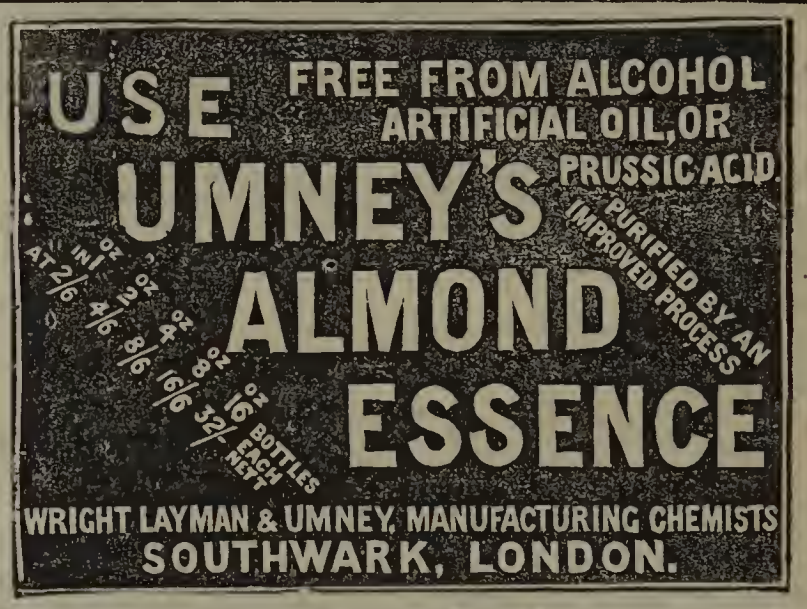
139 & 141, Farringdon Road (late 1 & 2, Corporation Buildings), London, E.C.

Chemists' Tea Agency.

WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S
INTERMEDIATE TEA, 2s. per lb.
BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—
AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.



PURE AËRATED WATERS.

J. H. THOMAS & SON'S

SODA WATER.	LEMONADE.
POTASS WATER.	LITHIA WATER.
SELTZER WATER.	*GINGER ALE.

** The best Ginger Ale in the Market.*

These Aërated Waters have stood the test for upwards of 50 years, and are second to none for Purity and Quality. Sold by all respectable Chemists, Wine Merchants, Hotels, &c. All Corks are branded "J. H. THOMAS & SON, Boston." For Terms and Show Cards apply to

J. H. THOMAS & SON,

Pharmaceutical Chemists by Examination,

13, MARKET PLACE, BOSTON, LINCOLNSHIRE.

LITHIA, with Potash or Ammonia.
CITRATE OF POTASH WATER.
POTASH AND SODA, B.P.
MINERAL ACID WATER.
PURE LEMONADE AND GINGER ALE.
Sole Makers of Stevenson's Aërated Lime Water.
The above may be had in Bottles or Syphons.
Orders for 6 dozen carriage free.
HOGG & SON, 1, Southwick Street, Hyde Park, W

NEPENTHE.

FERRIS & CO. *v.* GOODMAN.

Notice is hereby given, that by an Order of the Chancery Division of the High Court of Justice, made the 18th day of July, 1884, in the above action, it was ordered that the Defendant and others be **perpetually restrained** from selling, or offering for sale, any formula or recipe for **"Nepenthe,"** and from otherwise prejudicing the sale thereof by, or injuring the title thereto, or Trade Mark therein, of the Plaintiffs, Messrs. **FERRIS & Co.,** of Bristol, Wholesale Druggists, the **Registered Proprietors thereof.**

And it was further ordered that the Defendant do pay the costs of the said action.

Dated this 12th day of August, 1884.

(Signed) CHILTON & GREEN-ARMYTAGE, Bristol,
Solicitors for the said Plaintiffs.

Friedrichshall

NATURAL BITTER WATER

Owes its great reputation to the happy proportions of its ingredients, which have constituted it an unapproachable and indispensable remedy for Constipation, Indigestion, Obstructions, Piles, Chronic Disorders of the Stomach, Liver and Bowels; Hæmorrhoids, Gravel, Gout, Plethora, Rush of Blood to the Head, Diseases peculiar to Females, Hypochondria, Lassitude, Impurities of the Blood and Skin, Eruptions and Blotches. It improves the appetite, keeps the head clear, the blood cool, but never debilitates. Its efficiency can be proved by the testimony of hundreds of physicians.

THE DIRECTORS OF THE SPRING AT FRIEDRICHSHALL, NEAR HILDBURGHAUSEN,

C. OPPEL & CO.

TO BE HAD OF ALL MINERAL WATER DEALERS AND CHEMISTS THROUGHOUT THE UNITED KINGDOM.

DISPENSING BOTTLES & PHIALS

MADE OF PURE METAL.

I. ISAACS & CO. Glass Bottle Manufacturers, beg to state that they have *greatly improved the quality of their Bottles*, and supply them at the following greatly reduced prices:—

Green FLINT, Flat or Oval, Plain or Graduated.

3 and 4	ounce	...	...	8s. 0d. per gross.
6 „ 8	„	...	...	8s. 6d. „
12	„	...	...	13s. 0d. „
16	„	...	...	16s. 0d. „

White Moulded Phials of Superior quality.

½	ounce and under ...	...	...	4s. 0d. per gross.
1	„ ...	...	...	4s. 6d. „
1½	„ ...	...	...	5s. 0d. „
2	„ ...	...	...	6s. 0d. „
3	„ ...	...	...	7s. 6d. „

Plain or Graduated to Teaspoons.

All the above are first rate quality. In ordering, please say "*pure Metal Bottles.*" A Sample Bottle of any kind forwarded free on application. Country packages, 1s. each. Bankers, London and Westminster.

ESTABLISHED UPWARDS OF FIFTY YEARS.

I. ISAACS & CO. Glass Bottle Manufacturers, 25, Francis St. Tottenham Court Road, London.

CHEMISTS' CASES.

SHIPPED f.o.b. in London, or sent, *carriage paid*, to any town in the United Kingdom on receipt **£10 10s.**

THESE CASES CONTAIN—

Doz.		*at per doz.*	£	*s.*	*d.*
3	Eno's Fruit Salt, 2/9 size	21/-	3	3	0
1	Do. do. 4/6 ,, ...	35/-	1	15	0
6	Pear's Soap, 6d. Tablets (unscented)	3/4	1	0	0
3	Do. do. 1/- ,, (scented) ...	6/8	1	0	0
	(*Or 6 doz. unscented 6d. at buyer's option.*)				
1	Seigel's Syrup, 2/6 size	21/-	1	1	0
1	Jeyes' Perfect Purifier, 2/-, glass bots.	12/6	0	12	6
	(*Or 3 doz. 6d. size at buyer's option.*)				
1	Do. do. 1/- glass bots.	7/-	0	7	0
2	Do. do. 6d. ,,	4/-	0	8	0
3	Do. do. 3d. ,,	1/6	0	4	6
1	Do. Sanitary Powder, 1/-, decorated tins	7/-	0	7	0
2	Do. do. 6d. do.	4/-	0	8	0
2	Do. Dog Soap, 6d. tablets ...	2/-	0	4	0
			£10	10	0

Cases containing half the above quantities, **£5 7s. 6d.**

All Orders and Remittances to be addressed to

FAIRMAN & CO.

Sussex House, 52, Leadenhall St.

LONDON, E.C.

LIQUOR BISMUTHI. SCHACHT.

Dose, ʒj, diluted.

Great pains are taken to ensure the absolute purity of this preparation. It is not only freed from the ordinary contamination of the metal, such as copper, arsenic, silver, &c., but that which so frequently causes an offensive odour to pervade the persons of those taking the ordinary preparations of Bismuth, namely TELLURIUM, is also most carefully eliminated.

Syr. Cinchonæ Alcoholicus, Schacht.
Bark minus the woody fibre. Dose, 10 to 30 drops, diluted.

Liquor Rhamni Frangulæ, Schacht.
A real aperient, mild and constant. Dose, ʒij to ʒiv, diluted.

Syrupus Sennæ Aromaticus, Schacht.
Made by cold maceration—does not gripe. Dose, ʒj to ʒij.

Succus Fuci Vesiculosi, Schacht.
The preserved conceptacular juice of the plant in its most active condition. This preparation has been used with excellent results, both internally, and also as an Embrocation in Rheumatism, &c. Dose, ʒj to ʒij.

The above Preparations are manufactured by Mr. Schacht himself in the laboratory of the firm.

GILES, SCHACHT & CO.

52, ROYAL YORK CRESCENT,

CLIFTON;

And can be procured from

BARCLAY & SONS, W. EDWARDS & SON, and all Wholesale Druggists in London and the Provinces.

KILNER BROTHERS,

Glass Bottle Manufacturers,

10, Gt. Northern Goods Station

KING'S CROSS, LONDON,

Invite the attention of Chemists and others to the large variety of Glass Bottles, &c., that they supply, and solicit orders for same.

DISPENSING.—Green and White Flint, of all sizes and shapes.

PERFUMERY.—White Flint, in different styles.

FEEDING BOTTLES.—"Our Babies' Bottle," in Green and White Glass, with white, brown or black fittings.

Illustrated Catalogues and detailed Price Lists of above and many other kinds forwarded on application.

ALLEN & HANBURYS'

EFFERVESCENT

SALINE

This is a finely granulated preparation, which in dissolving produces a sustained sparkling effervescence, and a clear, bright solution. It possesses all the advantages of an agreeable saline, combined with the anti-febrile properties of Chlorate of Potash, of which it contains a considerable percentage. It is, in short, an efficient aperient and febrifuge, and makes an exceedingly pleasant and refreshing beverage.

PRICES. This Saline is supplied IN BULK at **1s. 6d.** per pound; **1s. 5d.** per pound for 14 pounds; **1s. 4d.** per pound for 112 pounds; or in ½-pound bottles (to retail at **1s. 6d.**), **11s.** per doz.

WITH OR WITHOUT LABELS.

It is supplied also on the same terms with A. & Hs.' own Labels and Wrappers ready for Retail sale.

SAMPLES FREE ON APPLICATION.

MANUFACTURED BY

ALLEN & HANBURYS

PLOUGH COURT, LOMBARD STREET, LONDON.

BETTS & CO. LIMITED

(ESTABLISHED IN 1840),

SOLE MAKERS IN GREAT BRITAIN OF

METALLIC CAPSULES,

AND PATENTEES OF THE

Coloured Side Mark, Label, and other Speciality Capsules

(For the Prevention of Fraud and Refilling of Old Labelled Bottles)

As supplied to Bass & Co., and the leading Brewers and Bottlers of Wines and Spirits throughout Europe.

PLAIN ORDINARY CAPSULES,

For Small Phials, **2s. 6d.** and upwards per 1000, according to size, style, design, and quantity.

SPECIAL CONTRACTS FOR CONTINUOUS DEALING.

MANUFACTURERS OF

PURE ENGLISH MADE BOTTLING AND PACKAGE TINFOIL

From **1s.** per lb., and upwards. **MIXED FOIL** (Foreign Quality), from **6d.** per lb. (according to gauge).

PATENT BARREL PACKAGES AND SNUFF CANISTERS, &c.

MANUFACTORIES:

LONDON:—Chief Office and Factories, Wharf Road, City Road, E.C.; and Holloway and Batavia Mills, Holloway, N.W.
BIRMINGHAM:—Moor Green Fields.
PARIS:—Office, 4, Rue Mogador, Chausse D'Antin.
BOURDEAUX:—Office, 3, Quai de Chartrons; Factory, Monrepos, Floirac.

PATENTEES OF

Hydraulic and Mechanical Pressure Capsuling Machines,

ESPECIALLY ADAPTED FOR CHEMISTS' COUNTERS,

Largely in use by the Trade, and efficiency guaranteed for all sizes of Bottles, at Royalties from **5s.** to **£2 2s.** per annum.

LIEBIG COMPANY'S EXTRACT OF MEAT

The only brand warranted genuine by Baron Liebig.

CAUTION.—Numerous inferior and low-priced substitutes being in the market with misleading titles, labels and portraits of the late Baron Liebig, purchasers must insist upon having the Liebig Company's Extract of Meat.

The finest meat flavouring ingredient.
Invaluable and efficient tonic for invalids.
N.B.—Genuine ONLY with facsimile of Baron Liebig's Signature, in blue ink, across label.

SPECIAL NOTICE & CAUTION

BRAND & CO.

The original Manufacturers of Essence of Beef (green label under wrapper), and other Specialities for Invalids, have

NOT REMOVED

From their SOLE ADDRESS, No. 11, Little Stanhope Street, Mayfair, W., and caution the trade to

BEWARE OF IMITATIONS.

S. MAW, SON & THOMPSON'S
FEEDING BOTTLES

Patented in England, December 4, 1879;
Patented in the United States, April 27, 1880.

The ALEXANDRA (Earthenware Cap).

The EXPORT (Glass Screw Stopper).

		White Fittings.			Black Fittings.		
Alexandra, Earthenware Caps - -	*per doz.*	—	7/6	11/-	—	8/6	12/-
Alexandra, Earthenware Screw Stoppers	,,	—	—	11/-	—	—	12/-
Alexandra, Glass Screw Stoppers -	,,	4/-	7/6	11/-	4/9	8/6	12/-
Export, China or Wood Top Corks -	,,	3/6	—	—	4/	—	—
Export, 2nd Quality, Wood Top Corks	,,	2/9	—	—	3/6	—	—
Export, Earthenware Caps - -	,,	—	7/3	—	—	8/3	—
Export, Glass Screw Stoppers - -	,,	4/-	7/6	—	4/9	8/6	—

FOR FURTHER PARTICULARS SEE QUARTERLY PRICE CURRENT, pages 69 and 70.

SPECIAL QUOTATIONS TO WHOLESALE BUYERS.

S. MAW, SON & THOMPSON, LONDON

THE GALENICAL PHARMACY OF THE NEW PHARMACOPÉE FRANÇAISE.

(*Concluded from page* 122.)

In preparing syrups from the juice of fruits, the weight of sugar to be employed is regulated by the amount of sugar in the juice itself as indicated by the densimètre, of which a notable example will be found in Sirop de Groseille. Sugar is a prevailing French idea; they make snails into syrup (Sirop de Limaçons) and Perchloride of Iron; the Syrups of Sulphate of Strychnine and of Turpentine are both official. It is to be regretted that while there is so much sugar in their pharmacy, there should be so little in their strictures on each other. Were this not a serious commentary, it might be made piquant and amusing by quotations from French writers who seem to mistake vituperation for criticism.

Sirop Simple, Syrupus Simplex, is formulated thus:—

Sacchar. Alb.	1700 grams.
Aqua Destillata	1000 grams.

Raise to the boiling point; strain or filter.

In the cold preparation. Sugar 1800: Distilled water, 1000.

"They have omitted" observes a critic, "and it is an omission much to be regretted, to order us to examine by the microscope the distilled water we should employ in the manufacture of syrups, that we might assure ourselves that it did not contain microbes aérobies ou anaérobies, lacustres, palustres, fluviatiles, marins, aériens, pathogenes, chromogenes, etc. They have forgotten also to tell us at what period of the moon, and under what wind we should operate. It is, I repeat, a very regrettable omission to which I call the attention of the Commission."*

Solutés. Liquores. Solutions.

Soluté d'Acide Chromique. Equal parts of crystallized acid and distilled water.

Soluté d'Acide Phénique. Solution of Carbolic acid. For internal use 1 : 1000; for external use 1 : 100.

Soluté de Chlorhydrate de Morphine (Hypodermic.). Morphiæ hydrochlor.) 1'; Aq. Dest., 24. Five drops contain 1 centigramme.

Soluté d'Iode Ioduré. Iodine 5; Iodide Potassium 5; Alcohol at 90°, 50; Aq. Dest. 90. The Solutions are grouped under one heading, apart from the several substances.

Sucs Végétaux. Succi call for very little remark. They are clarified by direct filtration, or by heat, both by way of purification, or to render them less viscous. Acid juices from fruits are submitted to pressure, and are clarified by fermentation, not carried to an extent which would injure their essential properties. Appert's method of preservation is resorted to in the case of green vegetable juices.

Suppositoires. Suppositories have, during the past few years, been received into greater favour, owing to the improved method of manipulation, and to the attention directed to their manufacture by English pharmacists who have devised special apparatus for their more convenient production. The new Pharmacopée Française takes cocoa butter as the typical base, and rather leaves the subject to the ingenuity of the dispenser.

Tablettes et Pastilles. The first are composed of finely powdered sugar and mucilage, the paste being afterwards medicated; the second are strictly lozenges, made by means of heat with granulated sugar and water; and the terms employed are not convertible. By an unfortunate press error the quantity of flavouring essence named was stated as being sufficient for 100 grams of material. The tablettes would consequently have been far too strong; this has been corrected in the second edition to 1000 grams. Gum tragacanth, gum arabic, or gum Senegal are used to make the mucilage; sometimes a mixture of the two last, but tragacanth is the gum most generally employed.

Great discussion has arisen respecting these tablettes. A uniform weight of 1 gram has been adopted, though the proportion of active ingredients is unchanged. The colour in some instances has been changed, and this may lead to unpleasantness with a customer who judges solely by appearance. Thus the Tablettes de Chlorate de Potasse, formerly coloured with Carmine, as well as the Tablettes de Santonine, now appear quite white. Tablettes de Calomel is the only preparation which still retains the Carmine. Calomel Lozenges, moreover, now weigh 1 gram, uniformly with the rest, instead of the old form of 50 centigrammes.

We admit the trade difficulty, and know by experience the inconvenience of such changes.

Tablettes de Borate de Soude.
(New preparation.)

Pulv. Boracis	100 grams.
Pulv. Sacchari	900 „
Gum Tragacanth.	2–50 c.g.
Water	60 grams.
Tinct. Benzoin	10 „

Make a mucilage with half the water and tincture; mix the borax with half the sugar, and pass through a sieve. Incorporate the rest of the sugar, water and tincture with the mucilage, and, lastly the saccharated borax. Weight of Tablette, 1 gram, containing 10 centigrammes of borax.

Tablettes de Lactate de Fer. (Ferri Lactas).
(New preparation.)

Ferri Lactas	50 grams.
Pulv. Sacchari	1000 „
Sacchar. Vanillæ	30 „
Mucilag. Gum Tragac.	100 „

Triturate the Lactate of Iron with a quarter of the powdered sugar before adding it to the prepared mass. Weight of Tablette, 1 gram, containing 5 centigrammes of Lactate.

In the same manner the Tablettes of the Ammonio-Citrate, and Ammonia Tartrate of Iron are prepared. The sentence in the Preface alluding to these introductions, by a printing error, is misplaced.

Tisanes for which we have an old English word Phtisan, are for the most part extemporaneous remedies, though for convenience several official formulæ are given. They may be infusions or decoctions, and are generally sweetened with liquorice root, or better with glyzine; honey, sugar or syrup.

The official directions have been simplified with advantage.

Reference to the Codex will obviate the necessity of reproducing these popular remedial agents.

Tisane de Réglisse (Rad. Glycyrrh.) is now instantaneously prepared by substituting 50 centigrammes of Glyzine for 10 grams of liquorice. The formula will be:—

Tisane de Reglisse.
Glyzine, 1. Aq. Destillat, 100.

Vinaigres Médicinaux. Acétolés. Aceta, made with

* *Union Pharmaceutique* (1884), p. 151.

the vinegar of white wine as before, but often strengthened by the addition of crystallized Acetic acid. In this section will be noticed as indeed throughout, that many formulæ have been arranged in convenient decimal numbers, leaving the original proportions without change.

Vinaigre Aromatique. Alcoolature Vulnéraire 1. White Vinegar 7.

Vinaigre Camphré. Camphor 1. Acid. Acet. Crysals 1. White Vinegar 38.

Vinaigre de Colchique. Colchicum bulb. (fresh) 0. Acid. Acet. Crystals 1. White Vinegar 49.

Vinaigre de Scille. Squills (dried) 5. Acid. Acet. Crystals 1. White Vinegar 49.

Vinegar of Squills, therefore, is half the strength of Acetum Colchici.

Vinagre Phénique. (*Carbolic.*)

Acid. Carbolic. Crystals	2
Acid. Acetic. 1·060	20
Aqua Destillat.	98

This is the only instance in which commercial acetic acid has been ordered in the preparation of Aceta.

Vins Médicinaux, Vina. The wines now sanctioned, are the Red and White French wine, containing about 10 per cent. of alcohol ; Malaga and others ; and Vin de Grenache, introduced for the first time, contains about 15 per cent. of alcohol.

Also Vin de Lunel is of the same strength.

Vin Chalibé. Vinum Ferri has for its formula :—

Ferri Ammonio-Citrat.	5 grams.
Vin de Grenache	1000 grams.

Dissolve the Citrate in twice its weight of water before adding to the wine. Twenty grams containing 10 centigrams of ammoniated iron.

The withdrawal of Vin de Malaga from this preparation is an undoubted gain, as far as its keeping properties are concerned.

The old Vin Emétique (Antim. Potassio Tart. 1 : 300) has disappeared ; on the other hand, there is a Vin de Boldo (leaves), and one d'Eucalyptus ; (leaves) ; formulæ are likewise given for the Wines of Coca (leaves) Colombo (root).

Pepsine and Quassia (wood).

Vin de Quinquina. Œnolé de Quinquina. Vinum Cinchonæ.

Quinquina gris.	50 grams.
Alcohol (60°)	100 grams.
Red wine	1000 grams.

Macerate the powdered cinchona with the spirit twenty-four hours ; add the wine and macerate ten days. Strain and filter.

The wines of Yellow or Red Cinchona are made in the same way, 25 grams, that is half of the respective barks to be employed ; and white-wine may be substituted. When these wines are prepared with Grenache, Lunel, Malaga, or Madeira, or wines other than Vin Rouge, alcohol is not to be used. Vin de Quinquina Ferrugineux is an Iron and Cinchona wine made by the addition of ferrous sulphate dissolved in solution of citric acid. 50 grams contain 10 centigrammes of ferrous sulphate, equal to 2 centigrammes of metallic iron. Considerable discussion has taken place with regard to Vin de Trousseau, a hospital form appearing under the title of Vin de Digitale Composé de l'Hôtel-Dieu. Importance evidently is attached to the preparation, since the preface states : "The primitive formula of Vin de digitale composé (Vin de Trousseau) had been modified. This remedy has become the object of special study. The quantity of digitalis which enters into its composition has been fixed and a definite formula established." Complaint has been made that its constitution having been altered, there may be danger of confusing the new remedy with the old. Notably, the proportion of squills in the first edition was doubled. This has been rectified in the second issue, and we print the formula as it now stands.

Digitalis leaves (dried and powdered)	5 grams.
Squills (scales)	7·50 „
Juniper Berries	75 „
Acetate of Potash (dried) . . .	50 „
White wine	900 „
Alcohol (90°)	100 „

Bruise the squills and juniper and macerate with the digitalis for ten days in the wine and alcohol. Press and strain. Dissolve the acetate of potash in product. Filter. 20 grams contain about 10 centigrammes of digitalis and 1 gram of acetate of potash.

Vin de Pepsine.

Pepsine médicinale	50 grams.
(or Pepsine extractive	20 „
Vin de Lunel ou de Grenache . .	1000 „

Suspend the Pepsine in the wine and leave it in contact twenty-four hours. Filter.

Test for Vinum Pepsinæ.

The mode of operation is the same as that employed in ascertaining the strength of the Elixir of Pepsine.

Put in a wide-mouthed flask—

Elixir / Wine of Pepsine . . .	20 grams.
Distilled Water	60 „
Hydrochloric acid (offic.) .	60 centigrammes.
Fibrine recently dried . .	10 grams.

Digest six hours over the water-bath, and at 50° C. (122° F.), stirring till complete solution of the fibrine : afterwards every hour. Then filter the liquor, which should not be rendered cloudy by nitric acid.

The new French Codex has been issued in too great haste, and printing errors, sometimes serious, were allowed to creep into the first edition. They were grave imperfections in a work which was issued by authority, and the directions of which were legally binding.

In many respects the present Codex is an advance over its predecessor, specially in the simplification of the quantities ordered in a formula. Great gain would accrue from the adoption of one comprehensive alphabetical arrangement, to which plan a very careful examination of its contents suggests no objection. Certain antiquated formulæ might in the nineteenth century be allowed to disappear ; and for their retention it would be difficult to raise a sound pharmaceutical defence.

According to our island notions a Pharmacopœia is a collection of authorized formulæ, devised as skilfully as may be. In France a Codex is also intended to convey official information as to the manner in which various operations should be conducted. This difference between the Pharmacy of the two nations must be recognized before we can fairly pronounce an opinion on the new Pharmacopée Française.

To assist the memory of the reader a few popular names are subjoined which are sanctioned by common use.

Acétolés = Aceta. Vinegars.
Alcoolés = Tincturæ.
Apozème = Decoction or Strong Infusion.
Baudruche (la) Gold Beater's Skin. Gommée. Adhesive with Isinglass.
Baume du Commandeur = Tinctura Balsamica.
Brutolés = Medicated Beers.

CACHETS = Wafer Papers.
CACHOU = Catechu.
CASSE (Offic.) = Cassia fistula.
CATAPLASMES = Poultices.
CATHOLICUM. Compound Rhubarb Electuary.
CÉRAT A LA ROSE = Lip Salve.
CÉRAT SATURNÉ = Goulard's Cerate.
CLOUS FUMANTS = Pastilles (for burning).
COLLUTOIRES = Soothing Syrups.
DIAPALME (Emplast.). White Wax and Sulphate of Zinc.
DIASCORDIUM. A polypharmic Electuary.
EAU BLANCHE = Liq. Plumbi Diacetatis.
EAU PHAGÉDÉNIQUE = Yellow Wash.
EAU DE RABEL = Acide Sulfurique Alcoolisé. Alcoholic Sulphuric acid.
EAU SÉDATIVE = Ràspail's Formula. (Ammonia; Camphor; Common Salt.)
EAU VÉGÉTO-MINÉRALE = Goulard's Lotion. (French formula.)
EAU DE VIE ALLEMANDE = Tinctura Jalapæ Composita.
EAU DE VIE CAMPHRÉE = Sp. Camphoræ.
ELIXIR DE LONGUE VIE = Tinctura Aloes Composita.
ETHÉROLÉS = Æthereal Tinctures.
FULMICOTON = Gun-cotton.
GOUTTES NOIRES ANGLAISES = Black Drop.
HYDROLATS = Distilled Waters.
LIQUEUR DE BOUDIN = Solution of Arsenious Acid.
LIQUEUR DE PEARSON. Arseniate of Soda.
LIQUEUR DE VAN SWIETEN. Bichloride of Mercury.
LOOCH BLANC = Almond Emulsion. (Sugar and Tragacanth).
LOOCH HUILEUX = Almond Oil Emulsion.
MAGDALÉONS = in rolls. Masses in a cylindrical form.
MÉDECINE NOIRE = Apozema Purgans. Black Draught.
MOUCHES DE MILAN = Blister Paper (or Tissue).
ŒNOLÉS = Vina. Wines.
OPIAT = Electuary. Not an Opium preparation.
PAPIER GOUDRONNÉ = Poor Man's Plaster.
PATE DE CANQUOIN = Caustic Zinc Chloride.
POMMADE DE LYON = Ung. Hyd. Ox. Rub. c. Vaseline.
SAINDOUX = Lard.
SAPINETTE = Bière Antiscorbutique.
SIROP { DE CUISINIER / DÉPURATIF / SUDORIFIQUE } = Syr. Sarzæ Comp.
SIROP DIACODE = Syr. Ext. Opii (weak).
SIROP DE KARABÉ = Syr. Opii c. Tinct. Succini.
SIROP DE NERPRUN = Syr. Rhamni cathart.
SIROP D'ORGEAT = Syrup of Almonds.
SIROP THÉBAIQUE = Syr. Ext. Opii (strong).
SPARADRAP. A plaster spread on some material.
TABLETTES = Trochisci (sugar and mucilage). Pastilles when made with granulated sugar, water and heat.
TABLETTES DE CACHOU = Catechu Lozenges.
TAFFETAS D'ANGLETERRE = Sticking Plaster (various colours).
TEINTURE DE CANNELLE = Tinctura Cinnamoni.
THÉ ST. GERMAIN = Species Purgativæ.
THÉ SUISSE = Species Vulnerariæ.
THÉBAIQUE (Extrait.) = Ext. Opii.
THÉRIAQUE = Mediæval Polypharmacy.
THRIDACE = Ext. Lactucæ.
TOILE DE MAI = Wax Sparadrap.
VIN CHALIBÉ = Vinum Ferri. De Trousseau (Digitalis comp.).

FLUID EXTRACT OF CAMELLIA.*

CHINESE OR JAPANESE TEA.

BY DR. SQUIBB.

The generic name of the plant is adopted for the title for the purpose of distinguishing the preparation made for therapeutic purposes from the tea used for domestic purposes, and the title should apply only to a carefully and accurately made preparation, and one made from carefully selected tea which should be of fairly uniform strength as judged by the proportion of caffeine it yields. In going into the tea market to select such a tea the writer was struck with the amount of care and precision applied in all the dealings in tea and coffee. The samples are taken with great accuracy and fidelity, and are so marked that they can always be matched within any reasonable time, and they are compared and judged of with an educated skill that is wonderful. The qualities, varieties and prices are so admirably arranged that any one can get what he wants, and the largest business is done in an office just large enough to hold the clerks, the books and the samples, the articles as sold being simply withdrawn from the storage warehouse.

If some of this order, accuracy aud skill could be carried into the drug market where it is so much more important it would be of great value. And if tea and coffee thus packed, transported, and dealt in in so accurate and so uniform and admirable a way, can be substituted for coca and guarana whose want of care and accuracy are almost the reverse of all this, the interests of medicine will be greatly advanced by the substitution.

In selecting tea for medicinal uses it is easy to avoid those which are loaded and coloured, and not at all difficult to get a perfectly natural and good tea, of good original quality, avoiding the high prices which the "fancy" or artificially flavoured teas command.

By an easy discrimination, aided by the experts, the writer selected a "basket fired" Japan tea, costing 45 cents per pound, as being quite appropriate for medicinal use. Tea contains, according to the authorities, from about ·6 to 4 per cent. of caffeine, and this tea gave by the following easy process of assay 2·87 per cent. of caffeine. The process is a slight modification of that of Dragendorff, given in his 'Plant Analysis,' English translation, 1884, pp. 62, 186. There is a very great discrepancy among the authorities in regard to the caffeine in tea. Bentley and Trimen, 'Medicinal Plants,' vol. i., article 34, give the range as from 2 to 4 per cent. while others give from 1 to 3 per cent., and it is highly probable that the process of assay used has much to do with the discrepant results. Tried by a good process it must be rare to find an unadulterated tea which will yield less than 1 per cent., and still more rare to find one that will yield 3·5 per cent.

After trying several processes and devices, as recommended by different authorities, on several varieties of tea, the following modification of the process given by Dragendorff was adopted. Of coarsely powdered tea, 10 grams intimately mixed in a mortar with 2 grams of caustic magnesia is stirred into about 100 c.c. of boiling distilled water, and boiled for five minutes. The liquid is filtered off, and the residue percolated with 50 c.c. of water. It is then again stirred into 100 c.c. of boiling water, boiled, and again the liquid is filtered off and percolated as before, this time continuing the percolation to exhaustion. The liquid amounting to about 360 c.c. in all, is evaporated on a water-bath to about 20 c.c., evaporating the weaker portions first so that the stronger may be subjected to heat the shortest time. The liquid extract is then transferred to a vial or flask, which it does not more than one-fourth fill, 25 c.c. of chloroform is added, and the mixture vigorously shaken for five minutes or more. It is then transferred to a separating funnel, where the liquids are allowed to separate, when the lower chloroform solution is drawn off into a tared capsule. The residue is then returned to the vial, 25 c.c. more of chloroform added, and the shaking and separating is repeated as before. A third washing with chloroform is only needed when great accuracy is aimed at, since usually the chloroform of this washing if evaporated separately does not yield over ·05 per cent. of caffeine. The separation of the chloroform solution, before it can be drawn off, commonly requires three or four hours, and if the capsule with the first portion be set in a warm place the chloroform will have nearly all evaporated off before the next portion is ready to be drawn into the

* From *Ephemeris*, July, 1884.

capsule. When the last portion is in, the evaporation is carried to dryness. The caffeine is left in a very nearly white and pure condition, and for all practical purposes may be weighed just as it is left by the chloroform. If a closer and more accurate weighing be required, it is dissolved by gentle agitation in the capsule in successive small quantities of distilled water, this solution filtered into another tared capsule, and this set in a warm place for spontaneous evaporation to dryness. A bed of very white and pure crystals is thus obtained and a very small amount of slightly coloured fatty matter is left behind.

Several varieties of very good tea were examined by this process, and one sample of Oolong tea, costing 69 cents per pound, was found to contain 3·12 per cent of caffeine. The others varied between 2·2 and 2·8 per cent, that bought for making the fluid extract yielding by duplicate trials 2·86 and 2·88 per cent.—mean 2·87 per cent.

The selection of a menstruum with which to exhaust the tea in making the fluid extract was a matter of much importance. The solvent should be such as to extract and hold all the useful constituents of the tea. It is easily seen that the caffeine does not wholly nor fully represent the tea, and also that the condition of this substance in the tea in its natural combinations is much more active than when it is separated out, as will be fully shown further on. Therefore the tea should be extracted without any chemistry, or any breaking up of its natural molecular construction, and by a simple neutral solvent. Beside this the fluid extract should be as nearly as possible soluble in water, and should contain the least practical proportion of alcohol, and should keep unchanged for an indefinite length of time, always in readiness for use. After many trials too prolix for relation, although a detail of them might save others from fruitlessly going over the same ground, a very good menstruum was found in a mixture of 20 parts by weight of alcohol, 5 parts glycerin, and 75 parts water, and the following formula and process by repercolation were finally settled upon:—

Take of—

Tea, coarsely powdered, 2000 grams or 64 troy oz.
Alcohol,
Glycerine, and
Water, of each a sufficient quantity.

Mix by weight 20 parts of alcohol, 5 parts of glycerin, and 75 parts of water, and shake the mixture well, for a menstruum.

Moisten 500 grams or 16 troy ounces of the powder thoroughly with about one-tenth of its weight of the menstruum, allow it to stand in a closely covered vessel for about twelve hours, and having packed it loosely in a cylindrical percolator pour menstruum on top and percolate until the tea is exhausted, the exhaustion being complete when the percolate may have very nearly the same weight for a given volume, as the menstruum.

Reserve the first 190 c.c. or 6·5 fluid ounces of percolate that passes, and the remainder of the percolate in fractions of about 240 c.c., or 8 fluid ounces each, numbering these fractions of the weak percolate from No. 1, to the end of exhaustion.

Moisten a second portion of 500 grams or 16 troy ounces of the coarsely powdered tea with about one-tenth of its weight of the weak percolate No. 1, allow it to stand, pack it and percolate it exactly as the first portion was managed, only that the fractions of weak percolate are used, in their numerical order, to be poured on top instead of new menstruum, and allowing each fraction to sink into the powder before the next is poured on. When all the fractions have been thus used, pour on new menstruum to complete the exhaustion as in the first portion.

Reserve the first 380 c.c. or 13 fluid ounces of percolate and add it to that reserved from the first portion, and receive the remainder of the percolate in fractions of about 240 c.c., or 8 fluid ounces each, numbering these fractions as before.

Moisten a third and a fourth portions of 500 grams each of the tea, in succession, and treat each of them and percolate them in exactly the same way as the second portion.

Reserve the first 475 c.c. or 16 fluid ounces of percolate from each of these portions and add it to that reserved from the first and second portions, and receive the remainder of the percolates in fractions as befere.

There will now be in the bottle containing the reserved portions (190 + 380 + 475 + 475 =) 1520 c.c., or 51·5 fluid ounces of reserved percolate, and this is the finished fluid extract which pretty accurately represents the tea in the proportion of 95 c.c. to every 100 grams, or minim for grain.

The fractions of weak percolate from the fourth portion are put away until the stock of the fluid extract needs to be replenished, and they are then used exactly as the third set of fractions was used on the fourth portion; and this management is continued and repeated to any number of portions through any number of years, reserving now the 475 c.c. or 16 fluid ounces from each portion, as finished fluid extract.

It is easy to see that the first making, namely, the 1520 c.c. of fluid extract, may not be critically accurate in representing the tea in the exact proportion of minim for grain, but it is sufficiently accurate for all practical purposes; and it is equally evident and mathematically demonstrable that, if not accurate, the process will become more so, with each successive repetition, for ever.

The great advantages of this process of repercolation are easily seen in an article like tea, where some of its qualities are very delicate and sensitive, and easily destroyed, and hence where it is of the first importance that all the properties should be extracted and preserved in their natural condition. Any heating process would, to the extent to which the heat was used, injure tea, coffee, coca, guarana, etc., and the writer believes would, or does, injure all medicinal organic substances.

The fluid extract of camellia, so made, is an almost syrupy, transparent liquid of a rich, dark, olive-green colour, almost black, with a fragrant odour of the tea and its agreeable bitter taste. It has an apparent sp. gr. of about 1·095 weighed at 15° C. = 59° F., compared with water at maximum density, as unity, while the menstruum, by the same standard, at the same temperature, has a sp. gr. of ·982. When mixed with water, syrup, or wine,—the three vehicles which will be most appropriate to its use for both adults and children,—it makes a somewhat opaque mixture, which is unsightly, but nothing settles out. Diluted with its own menstruum, the mixture is, of course, perfectly transparent.

This fluid extract, of course, contains the same proportion of caffeine as the tea from which it is made. In this case, that proportion being 2·87 per cent. each fluid drachm of the fluid extract would yield, by careful assay, 1·72 grains of caffeine, and 105 minims, or 1·75 fluid drachms would yield 3 grains of caffeine.

This fluid extract, when tried physiologically upon the same person, and in precisely the same way that caffeine and coca had been tried, commencing with 30 minims and increasing until the effect was reached, was found to be equally effective in the dose of 70 minims. That is, 70 minims of this fluid extract gave, upon these trials, the same comfortable restedness and the same wakefulness until ten o'clock, and permitted the same promptitude and soundness of sleep after ten o'clock, that was obtained from 3 fluid drachms or 180 minims of the fluid extract of coca, or from 3 grains of caffeine.

This 70 minims of the fluid extract, equal to 70 grains of the tea, yields only 2·01 grains of caffeine, and from this the first notable fact is that about 2 grains of caffeine in tea, in its natural condition, is equivalent in effect to 3 grains of caffeine extracted from the tea, and used as caffeine. This would be more remarkable if it was not so general as to be the rule with separated active principles. Next, it is noticeable that 70 minims of this fluid extract of tea is equivalent in this effect to twice and a half times that quantity of a fluid extract of the best accessible coca. Now, of course, it is not proven that

equivalency in this single effect of overcoming drowsiness, makes it generally equivalent to coca for medicinal uses, but when the subject is considered in all its bearings, it certainly establishes a strong probability that this effect is a good measure of its total medicinal activity.

If this be provisionally admitted it would follow that under whatever conditions coca has proved to be useful, tea would be found equally so in much smaller quantity.

Coca for centuries was in popular domestic use for the same purposes and effects as tea, before it was introduced to use as a medicine. Then why should not tea be introduced to use as a medicine as a substitute for coca when the one can always be had of uniform good quality while the other cannot;—when the effects are probably identical, and when the quantity of tea necessary to produce the effect is so much smaller, and finally when the cost of tea is uniform and generally from one-half to one-third that of the variable coca;—and when, if the quantity of each required to produce a given effect be taken into account, the cost of the effect by coca is about five times as great as by tea?

It is then highly probable that whatever therapeutic effects may have been actually realized from coca, will be better attained from tea. Then, it may be asked, why not be satisfied with tea in its universal domestic position, and let the physician simply order a cup of tea, when he may need its effects? The answer to this is that he will, of course, do so whenever the effect of a cup of tea is all that he wants. But the same reasons for taking coca from the domestic economy of the Peruvians, and introducing it into the materia medica in definite form, are equally good for tea, and are almost self-evident in both, In Peru and Central America coca is chewed in an indefinite, irregular and rude way, not at all adapted to therapeutics. In most civilized nations tea is drunk in the same indefinite way, and of various qualities and strengths.

In making the infusion for domestic use the common rule is a teaspoonful of tea for each person and an additional one for the pot, and as many cups of boiling water as there are persons to be served. This is all much too loose for therapeutic usage, even if that usage be only the simple restorative effects of single doses in conditions of debility and exhaustion. By actual trial of the amount of tea taken by housewives for a cup of tea varies all the way between 50 and 70 grains, and the tea is not exhausted in the domestic process within 10 or 15 per cent. of its strength. Then again if tea is to be used as coca is, as an auxiliary in the treatment of the opium habit and the alcohol habit, and in protracted debility, whether during disease or convalescence, it is required in uniform doses at stated times, or in other words the quantities and repetitions are of quite as much importance as the agent itself, because it is quite as much in the management of his remedies as in the remedies themselves that the skill of the more successful physician consists.

Again, the indications for this class of remedies are often plain to the observant physician in some conditions of children where it is important that the dose should be small as well as uniform, and it is in children and persons not habituated to the use of tea and coffee that this class of agents is most potent for good. It has long been known that coca and guarana had but little effect upon those who were habitual users of tea and coffee, unless given in very large doses, and that the doses had to be large in proportion to the quantity of tea and coffee consumed. This is, in a measure, equivalent to the circumstance that if the tea or coffee in such cases could be definitely and accurately increased for the special temporary condition needing or requiring it, the coca or guarana would be unnecessary.

From all this, it may be stated as being at least highly probable, that whenever coca or its fluid extract are indicated in therapeutics, tea or its fluid extract will be found to be a superior substitute, in doses of a little over one-third the quantity. The doses must, in all cases, be carefully adjusted to the widely differing susceptibility of different individuals. A fluid drachm of this fluid extract of camellia will probably be found to be an average adult single dose as a restorative. But for repetition throughout the twenty-four hours, or more, it would be too large, and would produce morbid vigilance.

In narcotic poisoning, or when it becomes necessary to interfere with or control accidental narcotism from any cause, three or four fluid drachms, or even more, may, and should be used, proportioning the dose to the condition which is to be counteracted.

FLUID EXTRACT OF GREEN COFFEE.*

BY DR. SQUIBB.

What has been said in regard to tea applies equally, in a general way, to coffee, and need not be repeated. It can always be easily obtained of excellent quality, at moderate and uniform prices proportionate to the quality, and, yielding the same physiological effect as guarana, it is fair to infer that it may be well adapted to the same therapeutic uses. Caffeine, though it does not represent the full power or activity of any of these agents which yield it as their active principle, is still a very useful measure of their activity. That is, they appear to be active nearly in proportion to the amount of caffeine they yield on assay. While they all give a far better—and perhaps a different—effect from the caffeine obtained from them, yet those which yield the most caffeine are required in the smallest doses to yield their own peculiar effect, however different that may be from the effect of pure caffeine.

Good authorities differ very much in regard to the proportion of caffeine in coffee. Bentley and Trimen ('Medicinal Plants,' vol. ii., article 144) say that coffee contains from ·75 to 1 per cent. of caffeine. Dragendorff, as quoted in Wood and Bache's 'United States Dispensatory,' latest edition, p. 310, examined twenty-five specimens of coffee of different kinds, and found a variation of from ·6 to 2·2 per cent. of caffeine; the latter proportion, however, was only found in a single specimen called Gray Java, none of the other varieties reaching 2 per cent.

The writer in selecting a coffee for this fluid extract, by the aid of the experts, took a Java coffee which was represented to be the same in quality as that formerly known as "Old Government Java."

The coffee was assayed by exactly the same process as that above described for the assay of tea, and the process answered very well until the chloroform was applied, when the albuminous matter of the coffee gelatinized with the chloroform, and no separation could be had. Ether was tried instead of chloroform, but with the same result, and when the ether was added, a little at a time, until the quantity was large, a transparent syrupy liquid was obtained that seemed entirely homogeneous. Finally the difficulty was surmounted by the device of precipitating out the pectin-like matter by means of alcohol.

When the infusion had been evaporated down to about 20 c.c., 60 c.c. of alcohol was added and the whole well stirred. The precipitate was filtered out and well washed with a mixture of alcohol and water 3 to 1, and the alcoholic solution evaporated to 20 c.c. This was then washed with chloroform exactly as in the assays of tea and guarana, except that only two washings were required. Three washings were made in one assay, and evaporated in separate capsules. They gave ·117, ·013, and ·000 gram. Total ·130 gram equal to 1·3 per cent. of caffeine from the coffee.

This fluid extract of green coffee was finally made with exactly the same menstruum, by repercolation in exactly the same way so fully detailed under the head of Fluid Extract of Tea, only that it was found better to powder the coffee until it all passed through a No. 60 sieve, and moisten the powder with double the quantity

* From *Ephemeris* July, 1884.

of liquid used with tea, and pack it more firmly in the percolator. The process was then very successful, yielding a more fluid preparation than that from tea, and of a more dingy olive-green colour. The mawkish smell and taste of raw coffee were very pronounced, and, though less agreeable than those of tea, were not disagreeable. The specific gravity is 1·096 at 15° C. = 59° F., that of the menstruum being ·982 at the same temperature, water at 4° C. = 39·2° F. being taken as unity.

This preparation, when tried physiologically in exactly the same way as the other agents were, was found to have just about half the activity of tea. In three trials, two with with 140 and one with 150 minims, the results were not distinguishable from those of 70 minims of the preparation of tea. Now the amount of caffeine in 140 minims of this fluid extract is 1·82 grains, and in 150 minims 1·95 grains, so that 1·95 grains of caffeine in its natural condition in coffee is equivalent to 3 grains of the pure caffeine extracted by the chemist, and is equivalent to about 2 grains of caffeine as it exists in tea, and about 2·58 grains as it exists in guarana.

This fluid extract of coffee in the presence of that of tea would seem to be a mere dilute and inferior duplicate, of which there are far too many in the materia medica already, and the only reason for its being offered is that the general testimony is very strong throughout all the authorities that there are a considerable number of persons who in health are very differently affected by tea and coffee. There are many persons who cannot,—or who believe they cannot,—take the one without harm, and yet can take the other with benefit; and a still larger number who can take both, but with much better effects from one than the other. If this be true in health it is likely to be emphasized in diseased conditions, and hence the possible or probable utility of the two preparations, although to the generality of mankind the effects of either might be equally acceptable. Where this is the case of course the preparation of tea is to be preferred. How much quantity or doses, and time of taking them, may have to do with the headaches, palpitations, morbid vigilance, dyspepsia, etc., attributed to each by those who can take the other with benefit, and how much may be purely imaginary, it is impossible to tell, but as long as such beliefs are very firmly fixed, and not uncommon, it may be well to have the two preparations, although they are for exactly the same purposes.

The method of comparing these agents by a physiological test is not offered as a method of precision, or as worthy of any great trust, and it is especially guarded against being received for more than it is really worth. It is only a practical plan, carried out with much pains and care, for close guessing at results. But the observations made are fairly consistent among themselves, and, therefore, place the agents in a true relation to each other. Any other person under as good or more favourable conditions might, apart from idiosyncrasy, get different results, but they would probably be in the same, or in better accord among themselves. The only very definite point made is the very wide difference in the activity of caffeine in its natural and its artificial conditions, and of this there can be no doubt.

The deduced equivalency in effect, presented in one view, is as follows :—

Of artificial caffeine 3 grains is equivalent to 180 grains of coca, which contains about ·45 grain of cocaine ;— and to 70 grains of tea, containing 2 grains of caffeine ;— and to 60 grains of guarana, containing 2·6 grains of caffeine ;— and to 150 grains of coffee, containing 1·95 grains of caffeine. This would make the amount of caffeine in the coffee a little the most active of all, since a smaller quantity produced an equal effect. But it is so near to the tea that they may be considered identical; while the caffeine in the guarana appears to be the weakest, and to approach most nearly to the artificially extracted caffeine. Besides this, it was rather indistinctly and indefinitely perceived throughout the alternations of the trials that, in the effects of all four of the agents there was something superadded to the effect from the caffeine. To say that their effects were better is very indefinite, yet it is about all that can be said. Perhaps it will qualify this opinion or judgment to say that the effects seemed broader or more general, or more comprehensive. They certainly were more agreeable, and gave a better sense of rest and well-being. When these agents may be given to more sensitive and more delicate organizations, impressible by smaller quantities, as in women and children who are in conditions to need them medicinally, then slighter differences will doubtless become more prominent and more important. It must always be borne in mind that the doses here used might be heroic, and not entirely harmless in delicate, impressible persons or conditions sensitive to this class of agents ; and that, as in medicines generally, each individual and condition is a law unto itself, and has its appropriate dose only to be ascertained by trial, the doses of the books being merely useful guides to commence by. These considerations of dose and effect are very important in a class of agents like these, which, though practically the same, are supposed to have such different effects upon different persons, because it is quite within the limits of probability that the differences are merely differences of effect of arbitrary dose or quantity upon varying susceptibility. That is to say, a person on whom a cup of coffee would give a wakeful, restless, uncomfortable night, with headache, while a cup of tea would be only agreeable and beneficial, is apt to forget that a cup of black coffee represents more than twice as much caffeine strength as a cup of tea, or is more than double the dose, and does not stop to try what two and a half cups of tea or half a cup of coffee would do, before condemning the coffee as never agreeing with him, while tea always did.

SEEDS OF ABRUS PRECATORIUS.

The structure of these well-known seeds, largely used for necklaces and other ornamental purposes, and employed in India as a standard of weight under the name of "rati," has been described by W. Tichomiroff in a paper read at the seventh meeting of the Russian Society of Physicians and Naturalists at Odessa.

He classifies the seeds of *Papilionaceæ* hitherto examined into three classes, according to the nature of their reserve-material, viz.: (1) Seeds containing a fatty oil, starch, glucose, and aleurone, such as *Arachis hypogæa* and *Dipteryx odorata*; (2) Those containing starch and aleurone only, as *Pisum sativum*, *Phaseolus multiflorus* and *Trigonella Fœnum græcum*. Those of *Abrus precatorius* constitute a distinct type. They contain a fatty oil and albuminoids in the form of finely granular protoplasm, but neither aleurone nor starch. Another characteristic is the persistence of the nucleus and nucleoli in the peripheral parenchymatous layers of the cotyledons. The crystals sometimes found in the parenchymatous cells may consist of stearic acid or hesperidin. The testa is composed of four layers, viz.: (1) Rods, colourless in the red part of the seed, while in the black spot they are of a purple-violet colour; (2) Pallisade cells, distinguished by their length, their branching, and by the folding and small diameter of their lower end; (3) Parenchyma, composed of cells elongated in the tangential direction; (4) Albumen, the cellular nature of which is already defined in the first layers, while the cells at a greater distance lose their individuality by becoming flattened radially, and at length coalesce into a homogeneous pellicle which cannot be decomposed into its separate cells even by maceration in chromic acid. In caustic potash the pellicle swells up strongly and forms local projections. The hilum has two of the layers of rods, but no pallisade-cells, these being replaced by sclerenchyma. With the exception of the albuminous layers, the cell-walls display distinct cellulose reaction. By chloride of iron the presence of tannin can be recognized in the albuminous layers and rods.

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PASTEUR ON INOCULATION AGAINST RABIES.

DURING the same week in which the meeting of the British Pharmaceutical Conference took place at Hastings, there was held at Copenhagen a most important International Medical Congress, which by reason of the large and widely representative attendance and the magnificent hospitality displayed appears to have been no unworthy successor to the meeting in London three years ago. At least one thousand members of the medical profession are estimated to have made their way from other countries to the capital of Denmark before the Congress opened, and a bare list of the names of famous men from Great Britain, France, Germany, America and other parts of the world would be too long for quotation here. Among them was Professor PASTEUR, who in a paper, read on the first day of the Congress, on "Pathogenic and Vaccinia Microbes," gave to an intensely interested audience an outline of the investigation that has been for some time past going on in his laboratory with a view to the prophylactic treatment of rabies, and explained the inferences that had been drawn from the results so far obtained. The subject is one of such far-reaching importance, being possibly, as hinted by the President of the Pharmaceutical Conference, destined to affect even the practice of pharmacy in a not very remote future, whilst the public has manifested a degree of interest in it so far in excess of what it usually displays in respect to physiological researches, that probably some information respecting the principal points in Professor PASTEUR'S communication will not be unwelcome in these columns.

Professor PASTEUR states that it is now four years since the study of rabies was commenced in his laboratory and that it has been continued without any other interruption than the enforced cessations dependent upon the conditions of the inquiry. The first studies were devoted to ascertaining the nature of the disease, its cause and development, and a considerable advance was made when it was proved that the virus of rabies always develops itself in the nervous system. Here, however, although it may fix itself in the brain, the spinal cord, the nerves, or the salivary glands, it never simultaneously invades all these together; nevertheless, there is one point which is always the seat of the virus, and that is the medulla oblongata, or, to use Professor PASTEUR'S more precise words, the uppermost portion of the spinal cord, which forms the point of transition between the cord and the brain, and is called the "bulb." When an animal dies of rabies there can always be obtained from this point a supply of virus which when introduced into another animal by inoculation on the surface of the brain in the arachnoid cavity, after previous trephining, infallibly reproduces the disease. It is well known that the interval between the bite of a rabid dog and the time when the disease becomes actively manifest in the recipient of the bite is far from uniform, and this difference in the length of the period of incubation would appear to be dependent rather upon variability in the quantity of virus introduced into the wound than to degrees of virulence in the poison under such conditions. This uncertainty in action constituted a stumbling block in the way of progress, until it was removed by the observation that when the virus is taken from the so-called "bulb" and introduced into another animal in the manner specified, care being taken to use a quantity of the virus in excess of that barely sufficient to reproduce the disease, its action is manifested with greater uniformity and the results of different experiments become comparable with each other. In this way it was ascertained that under similar conditions the action of the poison is fairly constant; for instance, when taken from a dog and introduced into a rabbit the incubation period lasts almost without exception between twelve and fifteen days, and never falls so low as eleven days. Having therefore recognized the existence of a virus apparently of approximately uniform strength, it was a natural corollary to M. PASTEUR'S previous researches that he should direct his attention to its "attenuation," if possible; it was found, however, that the methods of procedure which were followed in the case of chicken-cholera and splenic fever proved inapplicable in dealing with the virus of rabies. But an idea originally put forward by JENNER, that the disease known as "grease" or "horse pox" must have become attenuated in its poisonous activity by passage through the cow before it could have been introduced without danger into the human system, suggested the possibility of attenuating the rabies virus by passing it through the bodies of certain animals. Experiments were therefore made upon rabbits and the results were so far encouraging that the duration of the period of incubation became changed; but unfortunately the change was indicative rather of an increase than of a decrease in the virulence of the poison, since the period of incubation, which, as just stated, when the inoculation was made direct from a dog to a rabbit, never fell below twelve days decreased when the inoculation was made from rabbit to rabbit until after fifteen such successive

transmissions it had fallen to eight days. Guinea-pigs seemed even more capable of intensifying the poison, a maximum virulence having been attained after six or seven transmissions from guinea-pig to guinea-pig, with the duration of the period of incubation shortened to five days. That increased virulence was coincident with the quickened incubation was shown by the fact that the virus assumed to have acquired a maximum degree of intensity in rabbits or guinea-pigs when introduced into dogs manifested a virulence far surpassing that of rabies as usually met with. In other animals experimented upon also the poison appeared to increase in virulence, and so far the discovery was limited to the knowledge that there exist and can be produced different kinds of rabies, all of which are more violent and kill more rapidly than the rabies which normally occurs in dogs. When monkeys were operated upon in a similar manner, however, much more satisfactory results were obtained. The period of incubation, which in the case of a monkey inoculated from a dog lasted eleven days, became rapidly lengthened as the virus was transmitted from monkey to monkey, until in the sixth of the series it reached thirty days. Moreover, with each fresh transmission the virus appeared to be weakened, so that it became only capable of producing rabies in rabbits after a period of incubation increasingly prolonged with each fresh stage, though when this weakened virus was transmitted through a series of rabbits it regained its old virulence. This seemed to be the result towards which all M. PASTEUR'S experiments had been directed, since it promised to place within his reach a method enabling him to attenuate at pleasure the virulence of rabies, and he hastened to apply the facts in the vaccination of dogs as a protection against that disease. The details of the operation are given somewhat briefly, but it would appear that as a starting-point virus is used taken from a rabbit poisoned from a monkey that has been inoculated by poison that has been transmitted through successive animals of its own species until it no longer causes death when introduced through hypodermic or intravenous injection. This preliminary vaccination appears to be followed by a second vaccination with virus which has been transmitted through a series of rabbits.

Although Professor PASTEUR'S communication was enthusiastically received, it is not probable that his conclusions will remain unchallenged; but this is an ordeal to which he is by this time pretty well inured. At any rate the prospect of criticism never seems to interfere with his positiveness in the expression of his opinions, and there was quite a characteristic touch of audacity in a passage in his address when, ignoring all the doubts that have been raised as to the absolute conclusions he has formulated respecting the efficacy of his method of vaccinating sheep against *charbon*, he remarked that "if it were worth while, nothing would be simpler than to produce in man insusceptibility to this disease." But it must be admitted that so far as lay in his power Professor PASTEUR seems to have provided for submitting his theory of vaccination against rabies to a searching test. At his request, the French Government appointed a commission consisting of Messrs. BÉCLARD, PAUL BERT, BOULEY, TISSERAND, VILLEMIN and VULPIAN, at whose disposal he placed nineteen dogs that were supposed to be "protected" from rabies by vaccination for comparative experiments with them and nineteen "unprotected" dogs. The report of the Commission as to the result of the experiments up to the date of Professor PASTEUR'S communication showed that in the case of the nineteen unprotected trial dogs rabies had occurred in three out of six which had been bitten, in five out of seven which had been inoculated with virus in a vein, and in each of five that had been inoculated by trephining, whilst not a single sign of rabies had yet shown itself in any of the nineteen vaccinated dogs which had been submitted to similar treatment.

Another point that was specially discussed in the Section of Pharmacology and Therapeutics at the meeting of the British Medical Association was the difficulty in providing for a trustworthy definition of new remedies that have not yet acquired a position which would warrant their being included in the national Pharmacopœia. Dr. Hay recommended that the example of the United States should be followed and that the Medical Council should be pressed to draw up and authorize a supplementary list from which such substances as proved to be of permanent value should be taken and added to each successive edition of the Pharmacopœia. We may remind our readers, however, that as a matter of fact the secondary list was abandoned in the last edition of the United States Pharmacopœia. Eventually it was resolved to appoint a committee to consult with the Council of the British Medical Association, or to adopt such other measures as may appear needful for the purpose of forming a list of drugs and their preparations supplementary to the British Pharmacopœia.

* * *

It may interest some of the members of the Pharmaceutical Conference to know that two of the photographs that were taken of the excursion party assembled on the lawn at Normanhurst have turned out very favourably, and that proofs may be seen upon application in the Secretary's office at 17, Bloomsbury Square. We understand that copies may be obtained, price three shillings each, from the photographer, Mr. Jennings, Robertson Street, Hastings.

* * *

In a recent official report on the forestry of different countries it is stated that the wood industry in the Russian province of Viatka includes the annual production of about 72,000,000 lbs. of tar, 5,400,000 lbs. of pitch, and 2,160,000 lbs. of turpentine oil. The quantity of birch oil is given as 144,000,000 lbs. (4,000,000 poods), but it would seem probable that this is a mistake. The quantity of larch agaric from the crown forests in Russia sold during the year 1880 is said to have amounted to about 3700 lbs.

British Pharmaceutical Conference.

TWENTY-FIRST ANNUAL MEETING.

(*Continued from page* 173.)

The following papers were then read:—

Standardizing of Pharmaceutical Preparations.

BY G. F. SCHACHT.

The subject of standardizing our potent remedies has of late excited a good deal of attention in the pharmaceutical mind.

The idea contained within the words is excellent, for it must be admitted to be of the first importance that the physician should know exactly what he is administering to his patient, and at first sight this great desideratum appears to be identified with the fact of "standardizing." But I have felt that, like many other doctrines of value, it is capable of erroneous application; and an attempt to estimate the subject fully, and especially in its relation to the obligations of pharmacy towards the art of medicine, has led me to certain conclusions that I should like to express.

It may be better perhaps that I state them at once.

The first is—that it is our duty as pharmacists to standardize with even severe accuracy all preparations that are of known definite composition—and these only. And the second is, that we should exert ourselves to extend this class of remedies to the utmost, and to eliminate, as far as possible, all whose composition is unknown or even uncertain.

These, I say, are my conclusions—but I beg to offer some of the considerations that have led me to form them.

I would in the first place observe that the subject is not, by any means, exclusively pharmaceutical; but much rather is it a medical subject with a pharmaceutical side.

If to medicine proper belongs the administration of materials as curative agents, and to pharmacy the preparation and supply of those materials—then, upon the professor of medicine will rest the obligation to investigate the various powers of those agents upon the human system, and the determination of their remedial values. Whilst the scientific record of their physical and chemical properties will naturally fall to the practical pharmacist.

Now the practice of medicine is not, at the present moment, founded upon altogether exact principles.

So, at least, the most illustrious among the profession tell us. We read so, and we hear so from every address delivered from high places. Much regret is generally expressed for the fact, much honour is lavished upon those individuals (always said to be few in number) who labour to exalt their profession to the dignity of a true science, and hopes are frequently indulged in that some day these efforts will be directed by authority and their results systematized and sanctioned in proportions to their apparent truth.

In the meantime, it is universally admitted that the practice of medicine is very largely empirical; nor is there the least taint of disrespect implied in the statement.

The enormous difficulties that attend the scientific analysis of the phenomena of disease and recovery are too apparent to need more than the hastiest reference, and though we may join in the hope that some at least of these difficulties will be overcome, we may be quite certain that they cannot be easily removed, but must continue to exist for a long time to come.

And if, on the other hand, we have to express the opinion that the pharmaceutical portion of the art of medicine is definite, and that the demands made upon it by the other side have been fairly met, and its inquiries accurately answered, it must be admitted that this has been mainly due to the close alliance which pharmacy can claim with well-known systems of knowledge, and its problems being capable of elucidation under known lines of research.

The difference between two such questions as these—What organic principles can be educed from opium, and, what are the effects of these singly and combined upon the human being in health and in disease—appears to me simply immeasurable; indeed not to be a difference of degree, but one of kind.

Therefore, I must be understood neither to criticize the shortcomings of the one, nor to raise the praises of the other, if I indicate—simply indicate—that the work to be done for the progress of medical science lies primarily, and almost exclusively, with the professor and practitioner of medicine; and that our portion of the work which is connected therewith, is already systematized, and is able to declare itself ready to be utilized in any further scientific inquiry that may be suggested; but that, for the present, we have fairly well answered all the demands of authorized medicine.

I will attempt to illustrate the meaning of these few paragraphs.

There are, as all here well know, prescribers of very various kinds, and it is our duty and business to meet their wants, numerous though they be.

But especially would I remind you, on the one hand, of those whose prescriptions are more or less severe and simple—and on the other hand of those, whose style is more or less, let us say, poetic and vague.

Both and all are indulged by pharmacy to their hearts' content.

The exact prescriber who desires to mark the precise vital phenomena that attend the exhibition of an exact quantity of a special remedy—be it mineral or organic—can confidently rely upon pharmacy for the integrity of his experiment. Exact standard solutions of definite strength and of definite purity are at hand, and his dose can be apportioned to the nicest degree of accuracy.

Should his experiment, for instance, touch the subject of opiates, he can elect to prescribe the exact chemicals, morphia, codeia, etc., as he pleases, and in proportion as he desires exactness, exactness he can have. If he knows the remedial value of each of the numerous principles contained in opium and likes to prescribe definite quantities of every one of them in a single dose, he can do so, and pharmacy would be equal to the occasion.

But if, on the other hand, he prescribes the less exact extract of opium or the still less exact crude drug, the inference is that, for the moment at any rate, he has parted with exactness, and prefers the dash of vagueness that his prescription indicates. In this case also, he can have his way and pharmacy need not burden itself with vain regrets.

In prescribing opium, it is clear he did not want an exact dose of the chemical morphia—he preferred the indefinite mixture of things called opium; the responsibility of the pharmacist ceased with the correct dispensing of the prescription.

Medicine has for long demanded of pharmacy standardized morphia, and standardized dilutions of morphia and dilutions of other definite substances employed as remedies, and they have been instantly supplied. Bodies of this order lend themselves kindly to the minutest subdivision and very generally to the most exact verification.

But there is a class of pharmaceutical preparations very different from these. Oddly enough these have sometimes been called "simples," though really amongst the most complex bodies in nature, and it is about these that the pharmaceutical mind has been of late so much exercised—I venture to think not always wisely exercised.

How often has philosophy experienced the futility of the attempt to define the undefinable! Let me take a less ambitious comparison. Because we have contrived an instrument we call a thermometer shall we presume to measure the forces of the universe by the scales of Fahrenheit or Réaumur?

There are forces or modes of force in nature other than temperature; there are forces or modes of force in opium other than morphia, and in cinchona other than quina,

and in nux vomica than strychnia. How then can we scientifically measure them by any one fraction of their respective potencies?

The time may come when the readings of the thermometers may have much greater significance than they at present have. The time may come when the proportion of quina in bark may tell the expert more than it now does; but much has to be done before these moments can be reached, and it would be wise not to anticipate them.

Would it not be wiser to turn to the natural processes by which deficiencies of special knowledge are usually supplied, and if these can be seen to be in operation, rest content with the hope that results will follow in proportion to the effort made?

The natural process by which deficiencies in medical knowledge can be supplied appears to me to be—systematic medical research conducted under such authority as shall ensure the integrity of the investigation.

Pharmacy can assist in this inquiry, but it cannot conduct it. Its part in the work is important, but secondary. The initiation of every step rests with medicine proper, and we can do no more than assist with our science and our skill.

I think it might become the duty of organizations that represent pharmacy to offer co-operation at the right moment, but clearly that cannot be until some movement within the medical body indicates that organized work is about to commence. Individual research may be helped by individual assistance, as at present, but this will accomplish but little. The hope is that the profession of medicine as a whole will recognize more and more fully this great need of progress, and will set its heads and hands to range into scientific form the scattered fragments of its floating knowledge, and will authoritatively inaugurate a system of research that shall seek until it shall discover a firm basis for scientific medicine.

I am not sure that this is too much to hope for. Within the last few weeks I have received this pamphlet. It is entitled 'The Collective Investigation Record,' and it informs me of a Committee being called into existence out of the British Medical Association, to institute some system of collective investigation into certain of the mysteries of disease, and that this Committee has already commenced its labours. It contains some names most honourably illustrious in the profession, and I am glad to see among the sets of subjects announced as included in their programme "the collection of evidence as to the effects of certain remedies."

I have heard also that there is some probability of a chair being created in the University of Cambridge, the chief work in connection with which is to be the study of the operation of medicines in disease. These look like signs of the systematic inquiry to which I have alluded; and if it were possible for one or other of our pharmaceutical organizations to offer co-operation with either of these agencies, I think it might be well.

In the meantime let us pretend to nothing that we do not know, lest we mislead. We know for certain that all the medical potency of dilute hydrocyanic acid must depend upon the hydrocyanic acid that it contains—and let us be scrupulously careful to "standardize" our solutions to the authorized strength. But as we know but little of the medical potency of many of the principles that together constitute most of our galenical remedies, let us forbear to assign them a quasi-potency which a fuller knowledge may show to be erroneous.

To repeat my conclusions, then, in a practical form—I think—that bodies of definite chemical composition and their dilutions are eligible for standardizing; but preparations of the nature of vegetable infusions, tinctures, extracts, being for the most part mixtures of indefinite and unknown agencies, cannot be standardized without risk of misleading.

Whenever any one of this latter class of bodies has been so studied that the remedial potencies and chemical properties of all its elements are declared by authority to be well known—that one passes from the latter class into the former.

Standardized Pharmaceutical Preparations.

BY D. B. DOTT, F.R.S.E.

The subject of standardized preparations is one which has occupied a good deal of attention within recent years, and their introduction into the Pharmacopœia has been ably advocated at more than one meeting of the Pharmaceutical Society. It is not surprising that this opinion should be widely maintained after what has been brought to light regarding the variation in strength of some of the most powerful preparations of pharmacy as these are found in the market. All will agree that such preparations should be unvarying in their activity, so that at first sight it would seem that a system of standardizing is most desirable, and the best way of overcoming all difficulties. It is, however, because I believe that the introduction of such a system as that referred to would be essentially a mistake, that I have been led to lay before you these few remarks, in which I shall endeavour to establish the provision I maintain.

In the first place it is to be observed that in order to standardize preparations of a drug it is necessary that the amount of active principle or principles be capable of accurate and reasonably easy determination. This rule excludes from our consideration a large section of the *materia medica*, as there is a host of drugs whose active principles are unknown or incapable of exact determination. Speaking generally, indeed, it is only practicable to standardize preparations of those drugs which readily yield their active principles in a state of comparative purity. This immediately suggests the question, Why not in all cases employ solutions of the active principles in place of the old galenical preparations? I am convinced that this is the true solution of the problem as to how inconstancy of composition is to be avoided. No doubt we will be told that many medical men believe the tinctures and the like to be more efficacious than solutions of their active principles, and there is undoubtedly an opinion of that kind more or less prevalent, which must be respected, although it is held chiefly by the rank and file, and not, so far as I am aware, by any of the leading therapeutists. It seems incredible that a mixture of principles, sometimes antagonistic, often dissimilar, in their mode of action, should be preferable to the principles, pure and simple, or to a combination of them to suit a particular case. To use the words of a distinguished professor, "Pure alkaloids of definite composition, and therefore of unvarying action, are what the therapeutist requires, and the chemist who can furnish him with these, and by the readiest and cheapest methods, benefits both therapeutics and pharmacy as much as he who brings to light a new alkaloid."*

True, it may be said, but so long as there is a demand for these galenical preparations by the profession and the public, pharmacists must produce and supply them, and to ensure their being of proper strength, they must be standardized. Without doubt, so long as the Medical Council inserts in the Pharmacopœia a tincture of opium as well as a solution of morphia, and a tincture of nux vomica as well as a solution of strychnia, these tinctures must be prepared, but it remains to be proved that they ought to be standardized. In nearly all cases, if a drug is of proper quality, all the preparations made from it will likewise be of the right strength. That is to say, if opium (for instance) of the B.P. standard, be used for the production of the tincture or any other preparation which is made up to a given bulk, there can scarcely be any error in the result. Of course the rule is of universal application, that the material operated upon be of sufficient purity, and that the extraction be carefully

* *Pharm. Journ.*, [3], xiii., 762.

performed. It is said, however, that in the case of solid extracts there is a source of error, because the amount of extractive matter varies, and that not in direct proposition to the amount of active principle. I believe this is quite an exceptional condition of things, but it is true to some slight extent of opium, and apparently to a more serious extent of nux vomica. To some minds this may suggest the necessity of standardizing these particular preparations, but to me it rather appears a reason for their disuse. In any case, the question is reduced to somewhat narrow limits. I would now refer to an objection to standardizing pharmaceutical preparations which I have never seen noted, but which ought to be emphasised; that is, that the operation could only be safely performed with an amount of knowledge and experience which would not be always available. A serious error in analysis might lead to greater variations in strength than the pre-standardizers ever dreamt of.

There is another aspect of the question which must be referred to. An opinion seems to have been formed in some quarters that a standardized preparation is one which has undergone a process of purification or alteration. Quite recently there appeared in the leading medical journal an elaborate article on standardized laudanum, but the result there described is evidently not laudanum, but an impure solution of morphia salts.

Taking all the facts into consideration, I think we ought to be led to the conclusion that no general system of standardizing ought to be introduced into the British Pharmacopœia.

A vote of thanks having been passed to the authors of these papers—

Professor Redwood said he had listened with considerable interest to these communications, and he was prepared to go a considerable way with Mr. Schacht, at any rate to the effect that it was important in the interest of medicine, that preparations of a definite composition should be used as far as possible, and that such preparations should be standardized, yet he was anxious to show that they were called upon to go further than Mr. Schacht seemed prepared to go at present. Mr. Schacht had laid down too, what must be admitted, that the practice of medicine was, to a great extent, empirical; and while nine-tenths or at any rate a large proportion of the medicines employed for the relief of disease were preparations the exact compositions of which were unknown, and which they had not the means of becoming acquainted with, there seemed to be an idea shadowed forth that all such substances of unknown composition should be excluded from the practice of medicine, and if that were so, all he could say was that the practice of medicine being at present mainly founded on experience, for there was nothing yet very substantial to depend upon with reference to therapeutics beyond the observations made by medical men, who employed various agents in the treatment of disease, and were not yet able to determine entirely the mode of action of the remedies which were employed, it mattered not much whether the substances which were found to produce certain effects were of a perfectly definite and known composition or not. Of course it was clear that advantage would result, and that, in fact, every advance in medical practice must be founded upon the substances used in any particular case being, as far as possible, identical with those which had been successfully used in similar cases before; that was a mode of reasoning which must be applicable to indefinite as well as definite medicines. As he understood, what was contended for in connection with the standardizing of pharmaceutical preparations was that there should, as far as practicable, be methods by which their identity of properties could be insured; that in point of fact, medicines, whether galenical or chemical, should be subjected to certain means of examination by which it could be ascertained that they coincided, in certain properties, with the medicines intended to be used. There were many potent medicines, the efficacy of which was attributed to certain chemical principles, which were definite and known and which were of the nature of those Mr. Schacht had especially referred to as being those which he would advocate the standardizing of. But with reference to many of those medicines, the effects which had been produced by the active principles in a separate state did not at all come up to the effects produced by the preparations which contained those active principles associated with others. He saw no reason why the preparations of such articles as opium, cinchona bark and other substances which contained definite active principles, should not be, as far as possible, regulated so that the proportion of active constituents should be adjusted, leaving others which were less active undetermined. It must be admitted that this was a defective method of carrying out the object, but it was much better to carry it out as far as practicable than to reject it altogether. Taking for instance preparations of cinchona bark, which he had been actively working upon for some time; it had been shown that medical men and pharmacists had for a long time been using such preparations under the idea that they contained a certain proportion of the active principles, but they had been subsequently convinced that they were very deficient in those respects, and he saw no reason why, because they could not standardize every constituent in such a preparation, they should neglect to accomplish the object as far as possible. He was almost prepared to think at one time that Mr. Schacht's design in objecting to standardizing galenical preparations was that they should be discredited in the estimation of medical men, who should be driven to use only such medicines as were of a definite and known composition. He might be mistaken in this view, for certainly if it were contemplated he did not think it one which it was at all desirable to promote. Medical knowledge had not yet advanced to that position that even with regard to agents of known composition they were altogether acquainted with the *modus operandi* so as to make therapeutics anything like a scientific subject.

Mr. Plowman reminded the Conference that there were three papers now before them for discussion, first, that of Messrs. Dunstan and Short, who unhesitatingly recommended standardizing the preparations of nux vomica, and the two papers just read. Mr. Schacht did not advise the standardizing of any preparation other than those of a perfectly definite character, and Mr. Dott went on much the same lines. He was inclined to agree in the main with these two gentlemen. For instance, opium was largely used for diabetes, and the constituent which was said to be active in that case was codeia, and now codeia was extensively prescribed for that disease. What could be more absurd than to standardize opium for its strength in morphia, and then give it for diabetes? On the other hand there were bodies, not so complex, which had been pretty fairly exhausted so far as their active ingredients were concerned, and in which the physiological action of the constituents had been found to vary in no respect from the physiological action of the whole drug. In these cases the constituents might be taken as a basis, and the article standardized with confidence. He thought that nux vomica might be one of these; it contained strychnia, brucia, igasuria and igasuric acid. Now brucia was one of those things which had not yet been worked out, but so far as the evidence went, its action did not differ largely from strychnia, and nux vomica seemed to be one of those drugs where standardization might apply. There was no doubt that medicine was largely empirical, but a distinction between physiological action and therapeutic value must be drawn. There were many drugs the physiological action of which was not known, and from their nature never could be known, but whose therapeutical value was indubitable, and it was quite hopeless to attempt any standardizing of these. He could not agree with one statement in Mr. Dott's paper,

viz., that the idea that tinctures were more efficacious than the isolated principles was not held by leading therapeutists. He was brought in contact with some very distinguished therapeutists, and they certainly did think that many drugs, notably opium, had remedial effects which could not be obtained by any admixture of alkaloids.

Mr. HASSELBY suggested that medicine was largely empirical, partly because the same article in medicine was not always produced. It would be very useful if opium and certain other powerful remedies were standardized, especially to a man taking over a new business and stock. It would be a very great benefit to chemists in examining their own articles if there were a process for standardizing the tinctures of aconite, belladonna, and other preparations of that powerful class. In the race of competition nowadays, there was a powerful pressure upon wholesale houses, and no doubt, as was shown by the changes in the constitution of some of these old firms, and by the admission of young men of ability, they were aiming at a high standard of purity and strength, so that customers might depend on everything they sent out; but there were other wholesale houses which could not be so thoroughly depended on, and therefore chemists ought to be in a position to judge for themselves. He was once waited upon by a partner in a wholesale house, and asked if he would buy some camomiles; they were rather discoloured, and he declined to take them. The wholesale dealer said he had no patience with chemists, he could find no one to buy these camomiles, and that he should take them home and turn them into extract, which no doubt he did, and sold it throughout the country. He sincerely hoped that some of the abler chemists would take up the subject of standardizing these tinctures and preparations for the benefit of those who were not quite so learned in the matter.

The PRESIDENT said there was one consideration put forward in these papers, which was very difficult to answer, namely, that medicine was empirical; it was experience which had guided medical men, not their theoretical knowledge of the powers of things which they had administered as medicines. For instance, to take such an article as bismuth, who could by any *a priori* reasoning have arrived at the conclusion that the preparations of that metal would prove useful in the many diseases for which bismuth was now found so valuable? That was an instance of the difficulty of treating medicinal agents in a manner as scientific as they all might think desirable. Medical men were therefore obliged sometimes to accept a drug which was not quite understood as far as its action on the system went, but to be guided by experience as to its medicinal properties, rather than throw it over because the reason it possessed those properties was not understood.

Mr. MARTINDALE said he wished to say in reply to Mr. Schacht that, although with regard to preparations they could not all be standardized, when you came to such crude products as opium, barks and nux vomica, which came into the market perfectly valueless for alkaloid manufacture, there ought to be some system by which they could be examined and pronounced to be unfit to be used in medicine. But when you came to other preparations it must be remembered that the standardizing of them would entail a very great deal of labour, and the question was, How were pharmacists to be repaid? He feared the tendency would be to throw a great deal of the trade into the hands of the wholesale manufacturer. In such cases competition would come in, and in the case of opium, for instance, the preparations might be standardized by the proportion of morphia with the omission of codeia altogether. The same with regard to tinctures of bark. The compound tincture might be made containing so much cinchonine, and it would only be worked up to a certain strength in that constituent which was supposed to be the active principle in pale bark. His view was that they should exclude bad drugs from being employed by Pharmacopœia tests, rather than standardize the preparations in the Pharmacopœia.

Mr. GERRARD, whilst in favour of standardizing where it could be properly applied, saw a great many obstacles in the way of the process being carried out to any great extent. There were but very few drugs in the Pharmacopœia which admitted of it with any degree of accuracy. Scammony might be standardized for resin, and perhaps elaterium for elaterine, and perhaps belladonna for atropine, or the mixed alkaloids, considering that the alkaloids were all of the same molecular weight; but with reference to nux vomica he felt a certain amount of doubt, as the principal alkaloids, strychnia and brucia, were not always present in uniform proportion. Again the alkaloids of opium and of cinchona barks admitted of a certain degree of standardizing, as mentioned by Mr. Martindale, where the total percentage of alkaloid could be mentioned with special reference to morphia in the one and quinia in the other. But how was it proposed to deal with the question of maintaining these galenical preparations to the standards when they were prepared, because most were subject to change? The tincture of to-day was not the same as it was twelve months ago. No doubt the active principles were involved in changes, and became to some extent destroyed, and he did not see how this difficulty was to be met. He was inclined to think that the subject would have to be entered into far more fully and carefully than it had been as yet.

Mr. SCHACHT was glad to find the difference between Professor Redwood and himself was one after all simply of degree. He was quite content to leave it to the practical wisdom of his fellow pharmacists, of whose views he hoped the Professor was a fair exponent. Professor Redwood agreed in thinking that certain things should be standardized, but wished him to go a little further than the limit he had laid down. Of course that was simply a practical question, and at the end of his paper he ventured to say that as far as knowledge was obtained with reference to any complex body, more especially therapeutic and physiological knowledge, to the extent of enabling them to determine the therapeutic value of every ingredient in it, then it became a standardizable article. Mr. Plowman seemed to be of opinion that nux vomica was such a body, that they knew enough of it chemically, and that enough was known of it medically to enable some authority to declare how preparations of nux vomica should be standardized. To that very case he took exception, and had done so before on these grounds. They knew a great deal about strychnia, but his impression was that brucia had never been experimented upon, for the simple reason that it had never been obtained pure; commercially it certainly had not, and he thought it very doubtful whether it had ever been seen even by the men of science in a perfectly pure state. He was quite convinced, therefore, that there had been but a very imperfect knowledge obtained of its therapeutic value. Now, to go a little further, had the matter been studied in its relation to the effect one element might have on the other, given simultaneously as they would be given in the case of prescribing preparations of nux vomica? It certainly had not, and, therefore, there were no means of enabling the real value of the preparation to be ascertained by any process at present known. The relation between these two potent ingredients was not yet ascertained; they did not know in two separate samples of nux vomica what the proportion between the two alkaloids would be, but all experience showed that they would be different. So, therefore, to standardize an article which resulted from the manipulation of nux vomica by the amount of one of its ingredients seemed to him distinctly unscientific. On that ground it was he was opposed to the idea of standardizing galenical preparations. Professor Redwood seemed to think they were called upon to go further in this process of standardizing. But by whom were they called upon? The medical profession could not do so; they had no right to

do so; they had not done their part of the work; they had no right to ask pharmacy to go ahead of medicine. If medical men wanted strychnia, and very likely if they wanted brucia, they could have it; if they wanted anything they could have it; but they must make the first move themselves towards exact remedies. It was not for pharmacists to supply them with standardized products before they were wanted. A mere standardizing of a preparation by the amount of one or more of the alkaloids it contained would be misleading. It was giving an adventitious value to the preparation, which it did not necessarily possess, and was thus worse than unscientific. He did not blame the medical profession for being empirical; they were and must be empirical in the treatment of disease. They did not know the specific operations of the essential principles of opium; they gave the opium, because they knew that on many occasions opium did good, not because they knew the operation of each ingredient. That was the difference between empiricism and exact science. Why should pharmacists be so wonderfully anxious to supply a blank in medical science, when they were not asked to do so? Medical men prescribed extract of opium; if they wanted morphia or codeia let them prescribe it. At the same time he did not want to drive the profession to using nothing but exact remedies, but he wanted as much knowledge as possible to be gained about everything, and if medical men and pharmacists together could find out all about opium let them use their knowledge by all means, for then it would be an exact remedy, but until that time arrived he objected to attempting the impossible.

Mr. PLOWMAN added in explanation that he intended to refer before to some things which should be standardized, and some which should not, and he thought nux vomica might perhaps be standardized. He meant to imply that it was about on the border line.

Mr. DOTT said his position was simply this, he could not understand how one could standardize a galenical preparation by estimating the amount of alkaloid it contained if the activity were not due to that alkaloid. The very fact of adopting that as a means of standardizing was a tacit admission that the activity was due to the alkaloid. Some misunderstanding had arisen from using the word standardizing. Everyone would admit that drugs ought to be up to a certain standard of purity and genuineness. What he said was solely with reference to preparing tinctures or other preparations stronger than they ought to be, and then after finding the amount of alkaloid or other constituents in the tincture diluting to the required extent. With regard to medical opinion as to the value of tincture of opium and other preparations of opium compared to the alkaloids themselves, generally speaking, medical opinion on these points was probably wrong. The medical profession was the most prejudiced of all professions, and he could point out hundreds of instances in which ideas once firmly held had been exploded; for instance, with regard to the use of chloroform prepared from methylated alcohol and from pure alcohol, and other things of that kind. One instance was the popular belief, which was held by many medical men, that tincture of opium was valuable in diarrhœa, but morphia solution was not, whereas it was perfectly well known to others that solution of morphia was just as efficacious.

The Conference then adjourned.

Wednesday, August 13, 1884.

The chair was taken at half-past ten by the President.

The first paper read was on—

A FOSSIL ALOE FROM THE WEALDEN.

BY G. A. KEYWORTH, F.C.S.

When moving among the shingle which lies beneath the cliffs of Hastings, we may sometimes observe certain curious stony masses of paler or darker shades of brown, rounded by the roll of the waves and perforated with numerous longitudinal furrows which are studded with minute glittering crystals. At first sight these furrows might suggest the boring action of a teredo upon some piece of floating timber, but these masses are in reality portions of the stem of a fossil plant belonging to the endogenous or monocotyledonous order, having leaves with parallel veins. This great division of the vegetable kingdom, represented in the temperate zone by grasses and herbaceous plants, rises as we approach the tropics to the lofty palm, the bamboo, and the aloe, including numerous trees of extreme usefulness. One of the stony masses before you has upon its surface portions of the original bark changed into a brittle jet. It was taken thus out of the sandstone cliff, and fortunately preserved by the workmen. These stony masses consist of silica or flint with a trace of iron, and are almost entirely soluble in hydrofluoric acid. Under the microscope the whole is seem to consist of small crystals of quartz six-sided prisms with six-sided pyramids at both ends. (I have repeated an experiment made by Professor Göppert, of Breslau, in imitation of the natural process of petrifaction or fossilization, by steeping a slice of pine wood in solution of ferric sulphate, drying it and then burning off the carbon. The ferruginous residue shows the ligneous structure.) This fossil has long been known as the *Endogenites Erosa*, a name invented probably by Dr. Mantell, a geologist of great eminence, who devoted himself to the geology of the south-eastern portion of England. The name was well chosen, as referring merely to the eroded endogenous cells which are so conspicuous. Some have thought that these fossils belonged to the palms, or to a gigantic rush, or to the cactus, or, with Mr. Dixon, a distinguished Sussex geologist, to the tree ferns. Mr. S. H. Beckles, F.R.S., an eminent local geologist and *savant*, was fortunate enough to find a fossil leaf "*in situ*" with a portion of the stem, near the White Rock at Hastings. The leaf is lanceolate and resembles that of the aloe, and he considers that the great American aloe is the nearest living representative of this ancient fossil. When, we may ask, did these fossil stems bend before the sultry breeze, and when did the sap fill these furrows? The answer to these inquiries will take us back into the remote past, towards the earlier conditions of that globe on which we live. The generosity of Sir Thomas Brassey has adorned our Town Hall with an exquisite piece of sculpture, representing Edith, the betrothed of Harold, finding his dead body upon the battle field after that memorable conflict which crowned the Norman arms with victory. At a distance of some eight centuries, crowded with human history, this great event seems to us very remote, yet what a mere span when compared with the vast periods during which the material itself of this work of art was being formed. The slow deposition of chalk in sea water, its consolidation and upheaval, and conversion into statuary marble by the heat of intruded igneous rocks. The fossil before us was a living tree, flourishing with grace and beauty in this very neighbourhood, at a period long previous to the chalk era, under conditions known as those of the Wealden, so called because first studied in the south-eastern portion of England, called the Weald from its ancient forests. The Wealden was a fresh-water formation (shown in this map) deposited in the delta of one or more large rivers, flowing from the north-west, entering the lagoon near the site of Oxford and extending to Central France, the whole area being some twenty thousand square miles. It was laid upon a previous Oolitic floor, produced, together with other secondary formations, after the close of the Coal period. The Australian Continent presents now an area analogous to what this Oolitic floor was before the Wealden lake commenced, its kangaroos being representative survivals of the mammalian life of that period. Portions of the sandy shoals of the Wealden lagoon were occasionally left dry, and show us now ripple marks from

ancient currents, and sometimes the footprints of air-breathing animals of the strange amphibious unwieldy forms pictured on these sheets, and restored with great skill at the Crystal Palace lake. The Iguanodon, Hylœosaurus and Megalosaurus, gigantic lizards. The Pterodactyle, a flying lizard, was a Saurian reptile with the bones of the forearm and hand singularly elongated like those of the bat, while light and hollow as in the bird, thus giving the power of rapid flight and probably of swimming. Remains of some have been found in the Kentish Chalk as large as the Albatross, with wings fifteen or eighteen feet in expanse. The skilled comparative anatomist can sometimes from a single new bone describe the animal to which it must have belonged. A remarkable instance of this profound knowledge was shown by Cuvier, to whom Dr. Mantell submitted some strange fossil teeth found by his wife on a roadside stone heap near Cuckfield, in 1822. Cuvier pronounced them to be teeth of a new animal, a large herbivorous reptile (the Iguanodon), an opinion confirmed by subsequent discoveries. Dr. Mantell then visited the museum of the Royal College of Surgeons, and, assisted by Mr. Clift, found a close resemblance in the teeth of the modern Iguana of tropical America and the West Indies.

The fishes were chiefly of the Ganoid and Placoid orders. A portion of one of these, the *Lepidotus Mantelli*, with its enamelled scales, is before you. It was allied to the Gar-pike of the American rivers. The whole body was covered with large thick rhomboidal scales, coated on the exposed side with enamel. These fishes lived either in the lagoons of this great delta or at the mouth of the estuaries entering the sea. The trees of this region, growing upon the drier portions of the surface, consisted of various Pines, Cycads, Ferns, with Palms, and, as we see, the Aloe. The climate was sub-tropical. We must imagine a large area of sandy shoals and damp meadows resembling probably the existing delta of the African Niger, which stretches into the interior for more than one hundred and seventy miles and covers some three hundred miles along the coast. The sand thus carried by currents age after age slowly accumulated, together with mud; and thus, aided by a sinking process, the Hastings sand formation was deposited, together with other formations of sand and clay, the thickness of the whole Wealden series being estimated by Lyell at two thousand feet. Great changes then followed. The Wealden formation descended beneath the ocean, and upon it commenced the slow deposit of that chalk which we see at Dover, Folkestone and Beachy Head. When in the course of an enormous period this chalk had been deposited, it was slowly upheaved to form the vast ridge of the North and South Downs. A scalping and sculpturing process now set in, effected by the agency of ice and streams of water, and laying bare the Hastings sandstone formation. How difficult to realize all this, and how strange to reflect on the long imprisonment of these fossils, their burial during countless ages fast locked in the sandrock whose crown was now an ocean floor rearing a mighty burden of chalk, the uprising of the whole of which is seen in the bent and distorted Hastings Sand Strata!

The denudation referred to removed the chalk from the wide area of Pevensey Level, the Hastings Coast, the Pett Level by Rye to Folkestone, and far inland behind, extending westwards into Hampshire. At Tunbridge Wells a hard bed of white sand occurs, belonging to the Wealden formation, which occasions the picturesque scenery of the High Rocks and other resorts. To the Sandrock Hastings is indebted for much of the charms of its scenery. The warm tints of paler or darker brown, often seen in relief against a sapphire sky, give effects of light and shade which attract the pencil of the artist: the hills and valleys with rounded outlines clothed with verdure give variety to the Sussex landscape The Castle Hill at Hastings consists chiefly of what is known as Ashdown Sand, surmounted by some Wadhurst Clay on the north. The sand has been excavated for some hundreds of yards in the windings of the St. Clement's Caves. The East Cliff, with its fine outline, is composed in the same manner. The Lovers' Seat is placed in a nook of the Ashdown Sand overlying Fairlight Clay. The beautiful Glens of Ecclesbourne, Covehurst and Fairlight, have been carved by running water out of the same materials. The Dripping Well gives its little stream over a ledge formed by hardened beds of Ashdown Sand; and Old Roar, to the North of Hastings, said to have formerly had a fall of forty feet, trickles over a similar ledge of hardened Sandrock in the Wadhurst Clay.

At Bovey Tracey, near to Newton Abbot, in Devonshire, surrounded by the granite and other rocks of Dartmoor, is a barren tract of land which is an ancient fossil lake bed as it existed after the Chalk period. It is remarkable as being the only instance of the kind known in Great Britain. A lake of the size of Windermere existed there, fed by streams from Dartmoor, carrying down the finely ground granite and vegetable matter, and forming now a bed of fine clay, used with great success there in the manufacture of pottery. The lignite or imperfect coal into which the vegetable matter was converted, contains iron pyrites, and emits, consequently, a sulphurous odour on burning, but it has been applied to the baking of the pottery. The lake was surrounded by willows and the dwarf birch, together with many coniferous trees of the Californian Wellingtonia type, also ferns, vines, figs, dates and laurels, with water lilies. The cinnamon and palm also grew there. It has been inferred that, on the whole, a sub-tropical climate then prevailed in Devonshire.

Previous to the year 1872 nothing was known of the strata lying beneath the Wealden centre. In anticipation of the visit of the British Association to Brighton, Mr. Henry Willett then suggested the celebrated Subwealden Boring, with the twofold object of ascertaining the nature and thickness of the underlying strata, and also whether coal strata, as in Belgium and the Boulonnais district in France, extend across the Channel in this direction. Any additions to our Coal Seams are of grave importance when we remember that our national prosperity is largely dependent upon cheap and abundant coal, the consumption of which is steadily increasing by land and sea with the extension of steam power. Subscriptions came rapidly in, and the boring was commenced in August, 1872, on the estate of Mr. J. C. Mappin, at Netherfield, near Battle, by Mr. J. A. Bosworth, who attained a depth of three hundred and twelve feet. At the close of the following year the work was transferred to the Diamond Rock Boring Company, and carried seven hundred and six feet further. An accident to the rods now involved a new bore hole, which was commenced in February, 1875, and was extended to a depth of one thousand nine hundred and five feet, when another accident occurred, and the work was abandoned. The second hole had at first a diameter of eight inches, from which a solid core of rock seven inches in diameter was extracted. The size of the hole was lessened as often as it became necessary to line it, until at last the diameter was only two inches, yielding a one-inch core. The boring first passed through clay and shales, and at one hundred and twenty-five feet a bed of gypsum was reached forty-three feet thick. The rest of the strata consisted chiefly of sandstones and shales. Mr. J. E. H. Peyton, F.G.S., of St. Leonards, gave much assistance in examining the cores from the drill and collecting the fossils. Some important additions to geological science were made by this boring, and Sussex was raised to a place in the "Mineral Statistics," a shaft having been sunk near for the purpose of extracting the gypsum, and from this "Subwealden Mine" two hundred and thirty-four tons of gypsum, valued at £70, were raised in 1876. The mine is now worked with success on an extensive scale, the gypsum being of superior quality. This is the

only mine of any kind in Sussex, where, three centuries since, the woods resounded with the clang of heavy hammers and the roar of furnaces, whose glow was conspicuous by night. The manufacture of iron from the ferruginous sands and clays of the Wealden, commenced by the Romans, was at this period the most important in Great Britain.

The PRESIDENT proposed a vote of thanks to Mr. Keyworth for this very interesting paper on the fossil aloe. The geological subject was hardly within the usual range of the Conference, but as this paper came from a gentleman so well known as a local authority, and who had given such an interesting account of the geology of the locality, they were much obliged to him.

Mr. BORLAND said as this paper contained a considerable amount of information about the Wealden formation it was interesting to those who came from a part of the kingdom which was very much below the Wealden. But to return to questions more connected with the Conference, he would ask Mr. Keyworth what were the grounds upon which this fossil was considered to be an aloe. He stated that the leaf was lanceolate. He had always understood that the aloes had a broadly subulate leaf, not lanceolate, and, therefore, if this were really a lanceolate leaf he could scarcely consider it as belonging to the aloe tribe. He should like to have a description of the transverse section of the fossil, and then of the leaf, and they would then be in a position to judge whether there was sufficient evidence for placing it in the list of aloes. Then he should also like to know, if it really was an aloe, whether there was any reason to suppose that the graminivorous creatures of the period used it for therapeutical purposes.

Mr. HOLMES remarked that Mr. Keyworth mentioned the fossil aloe as being the nearest representative of the great American aloe. The name "American aloe" being commonly applied to a plant of a different natural order, viz., *Agave americana*, it was desirable to know whether Mr. Keyworth intended this plant or the *Aloe vulgaris* by the term "great American aloe." Mr. Keyworth had mentioned the occurrence of a jet-like substance in the bark of the aloe; this would seem to indicate more relationship with the genus *Dracæna*, several of the plants of this genus yielding resins. When at Whitby a short time ago he had noticed pieces of jet in a fossil trunk protruding from a boulder which seemed to indicate that jet was of the nature of a fossilized resin.

Mr. KEYWORTH, in reply, said he must apologize for bringing forward a paper which was not strictly pharmaceutical. For a long time he thought with Mr. Dixon that it was a palm or tree fern; but then he fell in with Mr. Beccles who at once said it was an aloe, because he found a leaf *in situ* which belonged to the aloe. He told him that he was perfectly familiar with the American aloe, and he had one in his possession at one time of very great size, so that he knew the leaf perfectly well. One gentleman had found fault with the word "lanceolate" as applied to the leaf, but having investigated several authorities he came to the conclusion that on the whole that was the right word. No doubt most people applied the word aloe to another plant—the Adam's Needle or Yucca, which had a sharp pointed leaf more like a lance. He much regretted that he had not been able to bring the leaf but he had little doubt on the subject, because Mr. Beccles was really a thoroughly scientific man and well versed in the subject.

The next paper read was on—

HYMENODICTYONINE, AN ALKALOID FROM HYMENODICTYON EXCELSUM.

BY W. A. H. NAYLOR, F.C.S.

A year ago I had the honour of submitting to the members of the British Pharmaceutical Conference "Additional Notes on the Bitter Principle of *Hymenodictyon Excelsum*."* The paper contained an account of the methods by which the alkaloid could be extracted from the bark, its physical characters and more important properties, and an intimation of its empirical formula, concluding with a description and the centesimal composition of a neutral body which had been isolated during the process of extraction.

In continuing the investigation the experiments have been directed towards determining the molecular weight of the alkaloid, and the present communication is intended to supply data from which the rational formula of the body may be adduced. Its basicity in the first instance was sought to be ascertained from an examination of the compound produced by its combination with monobasic mineral acids. These salts were prepared from the surplus stock that supplied the material from which on combustion the empirical formula referred to was deduced. As the results obtained exhibited impossible relations in the ratios between the base and the respective acids, it was decided to conduct the operations involved in the preparation, purification and desiccation of the alkaloid, under improved conditions.

A fresh supply was procured by exhausting with chloroform a mixture of lime and bark air-dried, and withdrawing the base from solution by agitation with weak sulphuric acid. From the acid solutionit was separated by caustic soda. It was thoroughly washed with cold water and taken up by ether; evaporation and re-solution in the solvent twice repeated sufficed to yield it in a state of purity.

Special attention is here directed to the circumstance that the process of evaporation—aqueous, alcoholic, ethereal—throughout this investigation was carried on in vacuo.

The same statement applies to the drying of the various products unless otherwise specified.

The base when purified from ether corresponded to the description of the alkaloid previously given and confirmed its behaviour towards reagents. An additional observation of considerable interest has to be recorded, viz., that by an extremely slow evaporation of its ethereal solution it assumed a distinctly crystalline form. Practical effect may be given to the condition by putting a little of the ethereal solution in a test tube and stoppering it with a cork through which a pin-hole has been drilled. After the lapse of a fortnight the residue when examined microscopically will reveal an abundance of well-developed acicular crystals. A new and striking reaction of the base with sulphuric acid was also noted. When placed in contact with this acid the solution by transmitted light assumed a lemon-yellow colour passing to a wine-red and ultimately a deep claret; by reflected light it presented a bronze appearance. The fluorescence was accompanied by the disengagement of sulphurous acid. On combustion the purified and dried alkaloid gave the following numbers:—·362 gram of substance burnt with oxide of copper in a current of oxygen gave 1·05 gram of carbonic acid and ·365 gram of water equivalent to—

Carbon	79·10 per cent.
Hydrogen	11·20 ,,

The nitrogen determination was vitiated by the accidental introduction of a little air towards the end of the operation. Subsequent results showed an error of nearly half per cent. in excess of theory.

Platinum Salt.—This salt was precipitated as a yellow amorphous powder from a neutral or feebly hydrochloric acid solution in alcohol on the addition of an alcoholic solution of perchloride of platinum. It was not appreciably soluble in cold alcohol and refused all attempts which were made to induce crystallization.

Analysis furnished the following numbers:—

1. ·499 grm. of substance gave on combustion ·6705 grm. of carbonic acid and ·2461 grm. of water.

2. ·411 grm. of substance gave on combustion ·5467 grm. of carbonic acid and ·1997 grm. of water.

* *Pharm. Journ.*, [3], xiv., 311; 'Year-Book,' 1883, p. 492.

3. ·350 grm. of substance gave on ignition ·092 grm. of platinum.

4. ·3725 grm. of substance, dried at 100° C., gave on ignition ·0965 grm. of platinum.

5. ·244 grm. of substance gave on ignition of corresponding ammonia compound ·063 grm. of platinum.

6. ·200 grm. of substance gave on ignition ·518 grm. of platinum.

These numbers assign to the platinum salt the formula:—

$$C_{23}H_{40}N_2.2HCl.PtCl_4$$

the theoretical values of which are placed beneath the experimental percentages.

	1.	2	3.	4.	5.	6.
Carbon . .	36·64	36·27	—	—	—	—
Hydrogen .	5·50	5·39	—	—	—	—
Platinum .	—	—	26·28	25·90	25·82	25·90

C_{23}	=276	36·48
H_{42}	= 42	5·28
N_2	= 28	3·70
Pt	=197·4	26·09
Cl_6	=213·0	28·15
	756·4	99·70

By placing in juxtaposition the theoretical values of the alkaloid itself with the numbers obtained by experiment a considerable deficiency in the percentage of carbon becomes apparent.

	Theory.	Found.
Carbon	80·23	79·10
Hydrogen	11·62	11·20

This deficiency was subsequently traced to the difficulty experienced in burning the body. Equally low results were at first obtained on burning the platinum compound. On substituting chromate of lead for cupric oxide the higher percentages were realized.

A determination of the chlorine in the double salt was also made. For this purpose ·244 gram of the substance was put into a tube with 3 c.c. of nitric acid (1·5), and an excess of nitrate of silver. The tube was sealed, heated to 200° C., and maintained at that temperature for four hours. At the end of that time, decomposition being complete, the tube when cold was opened, and the resultant chloride of silver was collected, washed, dried and weighed. It gave the equivalent of 27·67 per cent. of chlorine as against 28·15 per cent. The platinum in the filtrate from the chloride of silver appears in No. 5 estimation of platinum salt (*q.v.*).

Hydrochlorate of the Alkaloid.—This salt was prepared by neutralizing the dry base with a weak solution of hydrochloric acid and evaporating to dryness. ·2005 gram of alkaloid gave ·244 gram of dry, amorphous, yellow-tinted residue. The formula $C_{23}H_{40}N_2.2HCl$ requires ·243 gram. Other salts were prepared, but as they did not crystallize they were not deemed the most suitable for the purpose of this inquiry. From the composition of the hydrochlorate the *diacid* nature of the base may be inferred.

Ethyl Derivative of Alkaloid.—If hymenodictyonine be dissolved in twice its weight or more of alcohol, ethyl iodide be added in excess, and the mixture be heated in a sealed tube at 100° C.; the mixture gradually assumes a dark colour. If the temperature be maintained for two hours and then the tube be allowed to cool, abundance of crystals of an ethylated compound will separate out. A further crop of crystals may be obtained by concentrating the filtrate. Under a lens they are seen to form long needles and to arrange themselves in rosettes. The product after being well washed in cold alcohol and recrystallized from hot alcohol is obtained in a pure condition.

Two estimations of the iodine in the compound were made, and gave of iodide of silver equivalent to 38·46 and 38·50 per cent. of iodine respectively.

These percentages would correspond with a body having the formula—

$$C_{27}H_{50}N_2I_2=[C_{23}H_{40}(C_2H_5)_2N_2]''I_2.$$

The platinum salt of the diethyl derivative was also obtained. It was prepared from the iodide by removal of its halogen as silver iodide, substituting chlorine and precipitating with perchloride of platinum. It is very soluble in hot water, and crystallizes with great boldness on concentrating the solution. Cold alcohol exerts only a feebly solvent action upon it.

It gave on ignition the equivalent of 24·00 per cent. of platinum. The formula $[C_{23}H_{40}(C_2H_5)_2N_2]''Cl_2PtCl_4$ requires 24·29 per cent. of platinum.

These results agree in pronouncing the beautifully crystalline iodine compound to be the *diethylated iodide of hymenodictyonine*, having the composition as indicated above. Further, the formation of this compound shows the *diammonic* nature of the alkaloid, and if this fact be taken in conjunction with the mode in which the base combines with ethyl iodide, it may be justly inferred that hymenodictyonine is a *tertiary diamine* having the molecular weight represented by the formula $C_{23}H_{40}N_2$.

Lastly, these results present a close analogy in their chemical properties between nicotine and hymenodictyonine, and afford substantial evidence in favour of the homology of the two substances.

Although lack of material at the present time has prevented me from making a more complete study of this interesting alkaloid, it is hoped that its chemistry has been pursued to an extent sufficient to justify the physiologist in putting the alkaloid to the test. This is the more important from the reputation which the drug has acquired as a tonic and febrifuge among the Hindoo Natives.

Again, there remains to me the pleasing duty of acknowledging the kind services which my friend Mr. T. G. Nicholson has rendered me throughout this investigation.

The PRESIDENT in proposing a vote of thanks to Mr. Naylor said on the last occasion when this question was brought forward, some doubt was thrown on the exact composition of the alkaloid on account of the imperfect manner in which it was then known, but Mr. Naylor had now succeeded in clearing up that point by producing the alkaloid in crystals, which result was highly satisfactory.

Mr. GERRARD congratulated Mr. Naylor on the results of his work. He would ask him whether he had endeavoured to prepare any bromine or iodine direct substitution compounds, and if so, what results he obtained. He was much pleased to find that Mr. Naylor had been able to obtain the alkaloid itself in a definite crystalline form and also that he had used ether for that purpose. In his own work he found that by using pure washed ether he could obtain the most satisfactory results in the crystallization of alkaloids.

Mr. NAYLOR in reply, said he had only prepared a bromine substitution compound and he had not yet had time to examine that.

The next paper read was—

NOTE ON THE FILTRATION OF LARD.

BY W. WILLMOTT.

A recurrence to the subject of the treatment of lard in its preparation for an unguent basis appears, I am bound to confess, to call for some apology. My reason, however, for again bringing before the Conference this question is as follows:—Certain conclusions arrived at by me with regard to the advantages, or supposed advantages, of filtration as a means of "rendering" lard into the most perfect condition for pharmaceutical usage (and advanced in a paper read before the Conference meeting in the autumn of last year) have been controverted by some eminent pharmacists. This circumstance although not, I confess, altogether unlooked for, I feel I cannot pass by in silence.

In the paper mentioned, I stated as the result of certain experiments, that washing and straining, or washing

and filtering, were without advantage in the preparation of lard for use as an unguent basis, and, further, that filtration *per se* possessed no advantage in practice. In reply to this Mr. Conroy said "he found that by filtration he got a most excellent product which would keep good and sweet. He did not consider washing to be of much use, but careful filtration was necessary to separate decomposable matter." On a subsequent occasion Professor Redwood, at an evening meeting of the Pharmaceutical Society,* expressed his opinion on this same point as follows:—"Complete separation of all suspended matter is obviously important, and, therefore, filtration seems desirable where practicable." In conjunction with these opinions I ought, perhaps, to notice the conclusions arrived at by Mr. Edward Smith in his paper read at the Conference meeting held at Exeter in 1869. In this paper we meet with the most emphatic advocacy of filtration as "the best means of preparing lard" for use in pharmacy. Mr. Smith says:—"I cannot too strongly insist that if lard be required of first quality it is absolutely essential that it should be filtered through paper .... the germ of success lies in filtration .... to strain is to invite inferiority, to filter is to secure superiority, if not perfection."

In view of these very authoritative statements it seemed desirable to me to repeat my experiments in greater detail, and to submit this particular point to a most careful and very special observation, in order to verify or otherwise the conclusions I had advanced. To carry out this with all possible completeness the following specimens were severally prepared:—

Strained.

No. 1. Perfectly fresh "flare" melted in water-bath and strained through fine tow.

No. 2. As No. 1, but subsequently dehydrated† at a little above 212° F. and strained through tow.

No. 3. As Nos. 1 and 2, but with the straining through flannel.

No. 4. As Nos. 1 and 2, but with the straining through fine linen.

Filtered.

No. 5. As Nos. 1 and 2, but subsequently filtered through paper at 150° F.

No. 6. As Nos. 1 and 2, but subsequently filtered through paper at 200° F.

Washed.‡

No. 7. As No. 1, but subsequently washed, heated and strained through flannel.

Before stating the results shown by working with these prepared specimens, it would be well, perhaps, to ascertain what is really involved in the process of filtration to which, as will be seen, Nos. 5 and 6 were carefully submitted.§ The following table will show the very large divergence of result under varying conditions:—

*Quantities in weight, of Lard passing through various filtering and straining media at different temperatures during one hour; the funnel and filter being of the capacity of two imperial pints.**

Filtering and Straining Media.	100—110° F.	150—160° F.	200—210° F.
French Circular paper .	17 oz.	33 oz.	91 oz.
Thick grey paper. . .	40 oz.	95 oz.	183 oz.
Fine linen . .	62 oz.	Passes through freely at above temperatures.	
Flannel. . .	Passes through freely at all temperatures a little above the melting point.		
Fine tow . .	Passes through freely at all temperatures a little above the melting point.		

It should be stated that these quantities will vary to some extent, according to the following conditions, viz.: 1, the particular manner in which the operation is conducted; 2, the time, if any, allowed for running (for running it simply is) through the porous substance before the moment of commencing the trial;† 3, the constancy with which the filter is kept filled; 4, the exact size of the filter; and 5, the quality and character of the paper, etc., used in the process. Nor is this all: it is important to note that the rate of filtration diminishes as the time progresses. This is a material consideration, as it modifies very much the apparent ease and simplicity of the operation, and forms a contingency which at the outset may readily be lost sight of. The following will show this most clearly. With French grey circular paper at a temperature of 150–160° F. there will filter through during the first hour 33 avoirdupois ounces; during the second hour, 13 ounces; the third hour, 9 ounces; and the fourth hour, 7 ounces. At a temperature of 200–210° F. we get for the first hour, 91 ounces; the second, 35 ounces; the third, 23 ounces; and the fourth, 16 ounces. All this shows a gradual clogging up of the pores or interstices of the paper, rendering renewal (which is a very undesirable condition) imperatively necessary for the free progress of the operation. Thus it will be seen that the process of filtration, in addition to being something more than troublesome, is not so practicable or available as may at first appear.

But now the question arises, Is filtration necessary, or will straining through flannel or fine linen suffice to remove or keep back all solid or suspended matter which may subsequently tend to promote decomposition in the prepared substance?‡ Partly to determine how far such may be the case, a portion of each of the above-mentioned specimens, Nos. 1 to 7 inclusive, was allowed to pass into a test tube, and all being subsequently melted at the same temperature, the difference in clearness and uniformity of condition, when examined by transmitted

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* *Pharm. Journ.*, November 10, 1883, p. 365.

† The method of dehydration here employed was that laid down in the 1864 Pharmacopœia and is as follows:—"Again heat it" [the strained lard] "on the water-bath, stirring continually until it becomes clear and entirely free from water." There can scarcely be a doubt, however, that this result is better, though not perhaps so conviently arrived at, by allowing the fresh fat to be "hung up and freely exposed to air and light."

‡ In accordance with process described by Mr. Martindale, *vide Pharmaceutical Journal*, November 10, 1883, p. 374.

§ Mr. Conroy says:—"There is no necessity for any length of time to be occupied, as at a temperature of about 200° F. lard easily runs through filtering paper." This is perfectly true so far as it goes, but I venture to think that the process cannot, either with reference to practicability or otherwise, be dismissed in so summary a manner.

* In each instance the process was allowed to proceed for five minutes before noting the moment of commencing the hour.

† With thick grey paper at a temperature of 200°, no less a quantity than 2 lbs. 12 oz. literally *runs* through during the first five minutes. After one hour's filtration this quantity is reduced to 6 oz. for the same time; or 13 oz. if the paper be removed and cleansed from all extraneous matter adhering to its surface.

‡ It is, I think, quite a question,—and I must confess to some doubts,—as to how far particles of membrane and tissue are "the main and often sole cause of the rancidity of solid animal fats."

light, was practically *nil.** It simply remained, therefore, to test these specimens in the form of the most readily changing ointments, and to note carefully the results.

Table showing generally the effect as regards rancidity in the two most rapidly decomposable ointments when prepared respectively with strained and filtered lards.

Unguent. Summer. Temp. 65° to 80° F.	Strained. Specimens 1, 2, 3, 4.	Filtered. Specimens 5, 6.	Washed. Specimen No. 7.
Ung. plumb. carb., 4th week.	Changing.	Changing.	Changing.
Ung. plumb. carb., 5th week.	Rancid.	Rancid.	Rancid.
Ung. hyd. n. ox., 4th week.	Good.	No. 6. Changing.	Changing.
Ung. hyd. n. ox., 5th week.	Good.	No. 5. Changing.	Slightly rancid.
Ung. hyd n. ox., 6th week.	Slightly rancid.	Rancid.	Rancid.

A third ointment was also under observation, namely, ung. pot. iod. sine pot. carb. All the specimens of this soon became tinged or discoloured, such difference as was observable being distinctly to the disadvantage of those prepared respectively with the washed and filtered lards.

This general statement will suffice, I think, to show that, so far from the filtration of lard possessing any advantage in practice, the operation is one which, if I may be allowed so to express it, will be found to be "more honoured in the breach than the observance."

From these results, then, I find my former experiments clearly corroborated, and, furthermore, I am able to state that the most desirable method for adoption in preparing lard for use in pharmacy is one corresponding to that suggested by Professor Redwood on the occasion already referred to; or one assimilating, with some slight modifications, to the process of the British Pharmacopœia of 1864. These processes exclude both washing and filtration, and are undoubtedly the best that can be devised with a view to meet the object, or objects, desired to be attained.

I must again ask the indulgence of the Conference for bringing forward this well worn subject, but inasmuch as it may confidently be assumed that prepared lard will not disappear from the *régime* of Pharmacy, the method of treatment best adapted to secure the most satisfactory results can scarcely, perhaps, be too well considered.

The President said they were all indebted to Mr. Willmott for this very practical paper. The subject, though a well worn one, was of constant interest to those practically connected with pharmacy. If filtration really gave no practical advantage, it was very satisfactory to know it.

Mr. Naylor said this paper had not rendered it at all clear to his mind that filtration was injurious, or that if Mr. Willmott had performed the operation on a very large quantity of material, say half a ton of flare, he might not have obtained somewhat different results. Nor were the results, as he had announced them, very striking, except that they tended to show that it would be very unwise to attempt filtration through ordinary filtering paper. There was one other point which would have thrown considerable light on this question which he referred to last year. He did not altogether understand the vague expression "rancid." How was the rancidity tested, by the smell, the taste, by litmus paper or by determination of the amount of acidity? On this point he should have liked to have seen some better evidence brought forward. The difference would not be appreciable by the smell, he presumed, nor would a few degrees of rancidity be appreciated by litmus paper, or any physical appearance which the ointment might present. He was still of opinion from operating on very large quantities of flare, that it was better to melt it at a low temperature and then to rapidly pass it through filters; in that way a better looking product was obtained physically, and if the temperature was not raised too much and the filtration were conducted rapidly so as to remove all membraneous matters, the product would keep well for a considerable length of time.

Professor Redwood said he had not been so disappointed in the paper as Mr. Naylor seemed to have been, for he considered Mr. Willmott had done good service to the interest of pharmacy by the experiments he had made. It appeared to him that those results were such as might have been anticipated and were corroborated by his own experience. He had lately had a great deal of experience, a little outside pharmacy, with regard to the means of preparing animal fats in a state in which they would resist the influence of contact with atmospheric air for as great a length of time as possible. The estimates he had been compelled to form in reference to this subject, no doubt would not be quite approved by Mr. Naylor as being strictly scientific. Nevertheless, they were such as practical men were in the habit of employing, namely, an observation of the physical characters of the substances under investigation. It was not very easy with such a substance as lard to be able to indicate the successive changes which take place in it quite scientifically, but it was comparatively easy to ascertain what and when changes took place which were calculated to interfere with the application contemplated. This was pharmaceutically at the present time a very important subject; for some time past there had been a great deal of discussion and no small difference of opinion expressed as to whether it were desirable or not to retain animal fats as bases of pharmaceutical preparations, and those who had the supervision of the new edition of the Pharmacopœia had received a vast number of suggestions from medical men and others, to the effect that the time had come when animal fats should be excluded altogether from use as bases of external applications. He could not in the slightest degree sympathize with that opinion, believing that for a great part of the class of unguents employed in medicine there was no basis comparable to good sweet well prepared lard. The conclusion he had himself come to closely coincided with that expressed in the paper; that for the purification of lard or any animal fat, it was desirable that the operation should be carried on at as low a temperature as possible; that it should be freed as much as possible from other matters which were liable to become diffused in thin scales to a greater or less extent, and that the process should be conducted with as little exposure as possible either to water or to atmospheric air. These were the points to be specially aimed at. Everyone appeared to be of opinion that the freedom from foreign matter in lard was an object to be aimed at, and that this should be carried on without exposure to atmospheric air. He would hazard the opinion that the bad effect which Mr. Willmott had found to arise from fine filtration was, at any rate to a great extent, ascribable to the fact that the operation was necessarily comparatively slow and with a medium of that description there was no doubt much greater contact with atmospheric air. All porous bodies had a large amount of atmospheric air adhering to the surfaces, and in passing such a substance through a porous medium, it was really being subjected to a much more severe test than would otherwise be the case. That appeared to him to lay at the foundation of the different experiences in the experiments which had been narrated.

Mr. Cooke (Wandsworth) said he did not understand Mr. Naylor to say that he considered the experiments

* The absolute difference in clearness, if noted as a matter of priority of porous media, may be stated thus:—Paper, 1; flannel, 2; fine linen, 3; and tow, 4.

valueless, but that the results were disappointing, and he must say he somewhat sympathized with him. Upon a consideration of the nature of lard and the rapid changes which took place in it, the question for them as practical men, was whether exposing it to filtration did not do more injury than good. If it were filtered through very fine paper it took a considerable time and that meant its being exposed for a continuous time to a considerable heat. As they had heard, at 150° you got 33 ounces per hour, and at 200° a considerably larger quantity. That showed the higher the heat the more rapid the process, but was it desirable to apply even as much as 150°? What was removed by filtration was more than counterbalanced by the continuous application of heat and exposure to the atmosphere. His own experience was that the lower the heat applied and the more rapid the operation, the more satisfactory would be the result.

Mr. Willmott said after the exceedingly able remarks of Professor Redwood, there was little left for him to say. Mr. Cooke only corroborated the conclusions he himself had arrived at. Mr. Naylor complained of the results being disappointing, but he could not command results, and if they were not striking it was certainly not his aim to make them so. His object was to show that filtration possessed no advantage, and not only did it possess no advantage but, on the contrary, a slight disadvantage. With regard to rancidity, he mentioned on the last occasion that he made no attempt to examine the specimens chemically, since there was no difficulty in determining whether any specimen of ointment or lard was sweet or not. He was simply guided by physical characteristics.

The next paper was entitled—

The Composition of Seidlitz Powders.

BY WILLIAM MARTINDALE.

In the early spring of last year, while the weather was still cold, I had a box of seidlitz powders returned to me by a lady who complained that when mixed a foam or "scum," as she termed it, rose on the top of the effervescence and covered the sides of the tumbler. On testing one in the ordinary way, I found that what she stated was quite true. Further, on dissolving the contents of each paper separately in water, clear solutions were formed; but on mixing these solutions, especially if somewhat concentrated, a similar but not uniform result was produced. The constituents of the powders, which were obtained from the most renowned makers, I next tested for lime, but scarcely found a trace. On allowing the brisk effervescence to cease and stirring occasionally, after an hour, I noticed at the bottom of some of the tumblers a quantity of white sediment—not the same amount in each—whilst in one there was none. I then checked the weighings of the contents of each paper and found that although the alkalies were fairly correct—160 grains in each—the acids had been too liberally weighed. Some weighed as much as 39½ grains; the acids in a box of the same lot gave an average weight of nearly 37 grains, 35½ grains being the lowest (I ought to add my seidlitz powders are always *weighed*, not *measured*). I was a little puzzled, but the variation in weight showed the cause of the precipitate. If mixed in exactly neutralizing proportions no precipitate was formed.

On collecting some of the precipitate from the bottom of a tumbler, I found it was dissolved by liquor potassæ, and this solution, if acidulated by acetic acid, let fall a granular precipitate again, showing that it was; as I had suspected and tried by tasting it, acid tartrate of potash. It is true, if the water used in mixing the powder has been one rich in lime, the precipitate will contain some tartrate of lime. This also is soluble in liquor potassæ, and on carefully adding a slight excess of acetic acid the lime first separates as a fine white precipitate, but is readily redissolved on adding an excess of acetic acid when the granular precipitate of acid tartrate of potash begins to form. That lime present in the water does increase the amount of the precipitate and help to form the foam, I do not doubt, as I readily found it present, and in variable quantity by slightly washing with and dissolving the precipitate in distilled water, and applying oxalate of ammonia. It appears to be present in the precipitate about in the same proportion that it is in the water used; I found the precipitate from the Hastings water yielded little of it, that from the West Middlesex Water Company (*ex* Thames) more, and that from a well in Queen Square, Bloomsbury, much more. I had occasion to examine the water from this well some years ago, and found on evaporation that it yielded an abnormal quantity of lime salts; it is now closed to the public. Still lime in the water is not an essential for the production of the foam. I find on mixing a powder with 40 grains of tartaric acid in a small quantity of distilled water even a considerable quantity of foam is produced.

As I have before said, on mixing a seidlitz powder in only a small quantity, say six ounces of water, the amount of foam on the surface of the effervescence and also the amount of the precipitate were increased; these were also increased by reducing the temperature of the water. I have noticed too, as one would naturally suppose, much more precipitate is immediately formed if the powder be mixed the wrong way, *i.e.*, by dissolving the acid powder first and then adding the alkali, in place of the reverse. I also noticed that mixing a seidlitz powder reduced the temperature of the water from 2° to 4° F., varying according to the amount of water and the temperature of the surrounding atmosphere. It has, therefore, appeared clear to me that the foam of which the lady complained and the precipitate which I have mentioned are only caused when an excess of acid is used; they are increased by using a small quantity of water, and by having this at a low temperature, and also by the water containing lime in solution. It is true, on mixing a neutral seidlitz powder in a very small quantity even of distilled water, say five ounces, the foam on the surface of the effervescence does rise, but it is soon redissolved.

Reviewing these experiments the question arises, What should the composition of a seidlitz powder be? It is well known that it is not intended to represent the water of the seidlitz spring in Bohemia, from which it gets its name. This water contains principally sulphate of magnesia in solution with a small quantity of sulphate of soda, lime salts, etc. Christison, however, seems to think it is probable that the term "seidlitz," applied to these powders, is a corruption of the name of the Rochelle apothecary, Seignette; he for a long time secretly prepared the principal ingredient in them, what is commonly called Rochelle salt, or in French, *Sel de Seignette.*

All the English and American authorities that I have consulted agree as to the quantities of the ingredients in the alkaline powder; all give tartarated soda, 120 grains, bicarbonate of soda, 40 grains, as the composition of this. In the French Codex the powder is altogether weaker; it has Poudre Gazogène Laxative, with *syns.*:—Sedlitz* powder (British Pharmacopœia), *Pulvis Effervescens Laxativus*, the composition of which is bicarbonate of soda, 2 grams (about 31 grains), tartrate of potash and soda, 6 grams (about 93 grains), and tartaric acid, 2 grams (about 31 grains). As regards the quantity of tartaric acid to be used in conjunction with the 160 grains of mixed alkali, mentioned above, authorities vary very much. Pereira's 'Materia Medica' gives 30 grains; Paris's 'Pharmacologia' 35 grains, and says "The acid being in excess (?) renders it more grateful, and no less efficacious." Next the United States Pharmacopœia, 1882, has *Pulvis effervescens compositus*, with 35 grains of tartaric acid (in their Pharmacopœia of 1870 it had 36 grains); Squire's 'Companion' gives 37 grains;

* *Sic*, although indexed as Seidlitz Powders.

Attfield's 'Chemistry' 40 grains, and says that the salts swallowed are tartrate of potassium and sodium, tartrate of sodium, and acid tartrate of sodium (?) or of potassium, and that excess of acid gives an agreeable acidity to the draught. I am doubtful about this; to me the cream-of-tartar-like taste of acid tartrate of potassium as a granular precipitate is not agreeable.

Theory would require 35·714 grains of tartaric acid to neutralize 40 grains of bicarbonate of soda. but as the best commercial tartarated soda is generally faintly alkaline, I find that after eight hours, when all the effervescence has passed off from the solution of a mixed seidlitz powder, it has a faintly alkaline reaction, even if 36 grains of acid have been used, although the carbonic acid it contains gives it an acid reaction when the brisk effervescence has just ceased. This quantity of acid, 36 grains, is what I have always used and what I have inserted in the 'Extra Pharmacopœia,' after well weighing the different authorities and being aware of the results of the above experiments.

As seidlitz powders are often medically ordered, I think that a formula for them should be inserted in the British Pharmacopœia, and in fact, seeing how they vary in the amount of acid they contain, where the prescriber expects no variation, it is necessary that a formula should be there; much more necessary than that one for "solution of citrate of magnesia," which is rarely used in England, should find a place there.

In addition to the ordinary seidlitz powders in use, there are what I may term "fancy" seidlitz powders sold. Some are flavoured with lemon, some with ginger, and to others $\frac{1}{100}$ grain of tartar emetic is added to each powder, on the ground that, as Dr. Paris states, "this quickens the operation of saline cathartics." Without wishing to discourage the use of these, I think that when a physician orders a seidlitz powder it should be something definite, for which there should be an authoritative formula. "Extra strong" seidlitz powders are sometimes asked for, and prepared by adding 60 or 120 grains more of tartarated soda to each powder; for these, too, an authoritative formula might be given.

At the conclusion of the paper Mr. MARTINDALE gave the analyses of several seidlitz powders which had been obtained from so-called stores, the result of which was that there was in them a considerable excess of carbonate of soda, the cheaper ingredient, as compared with the Rochelle salt and tartaric acid, so that they would not be likely to get this precipitate of acid tartrate of potash from the cheap seidlitz; it would only be present where there was an excess of the dearer article, tartaric acid.

The PRESIDENT, in proposing a vote of thanks to Mr. Martindale, said his suggestion that there should be a recognized formula for seidlitz powders was well worthy of consideration. One expression used in the paper, "foam," was, he thought, new in chemical nomenclature.

Mr. ATKINS said they were much indebted to gentlemen who brought forward such practical papers as this, and he wished they had more of them. It taught them how much they were constantly observing without reflecting on what they saw.

Mr. KINNINMONT said in his locality seidlitz powders of ordinary strength were occasionally asked for, but they sold at least twenty double strength powders for one single strength. He should like to know whether Mr. Martindale had examined Eno's Fruit Salt. It presented an appearance very much like the first seidlitz powder shown, and it struck him it was simply the ordinary form of seidlitz powder with an excess of alkali. He was much struck with the word "foam," and had no doubt, if it were introduced, "Martindale's Foaming Seidlitz" would take the market. There had been about a dozen various receipts for Eno's Fruit Salt, but he found on examination it was simply a seidlitz powder with sugar and excess of alkali.

Mr. MARTINDALE said he had not examined Eno's Fruit Salt, but was always under the impression that it contained some chlorate of potash. Double seidlitz powders were very rarely asked for in the South; he did not sell one a week. They were certainly not so much in demand as they seemed to be in Glasgow.

(*To be continued.*)

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily or publication, but as a guarantee of good faith.*

ESTIMATION OF SPIRIT OF NITROUS ETHER.

Sir,—The process which I suggested last session for the estimation of spirits of nitrous ether was never supposed by me to be a method capable of great exactitude. It was only given as a ready means of roughly determining the amount of nitrite present, and I still believe the test to be of considerably value, notwithstanding the unfavourable criticism of Mr. Dymond, expressed in a recent issue of your Journal. That gentleman's wildly inaccurate results can only have been obtained by some plan of his own devising, and certainly not by the method described by me. The mention of starch paste is sufficiently suggestive of departure from my instructions.

The difficulties surrounding the subject and the sources of error appertaining thereto are as well known to me as they can possibly be to Mr. Dymond, but I am pleased to have read his paper, which is not wanting in points of interest—maugre a certain recklessness in criticism.

I reserve anything further I have to say on this matter, as I intend to discuss the question fully on an early day next session.

93, *Abbey Hill, Edinburgh.* D. B. DOTT.

PERMANGANATE OF POTASH PILLS.

Sir,—I have tried the various forms given for dispensing permanganate of potash in pills (except the Edinburgh apprentice's form), such as kaolin, vaseline and others, but with only partial success, whilst by simply using cera flava, I obtained most satisfactory results. I powder my permanganate and then take q. s. of cera flava, previously softened in hot water, work into a mass, and roll into pills at once. They are most easy of manipulation, and pills I have made in this way I have kept for three and four months without the slightest deterioration.

If your readers will try the various methods advocated, and compare them with the one I have here given, they will in future discard the other clumsy troublesome forms in favour of this one.

45, *Lowgate, Hull.* EDW. RYLEY.

J. C. Hyslop.—Apparently the flower of the "cardoon" (*Cynara Cardunculus*).

J. Hutchinson.—(1) Send a specimen with mature fruit. (2) *Atriplex hastata.* (3) *Medicago lupulina.* (4) *Triticum repens.*

S. Stephenson.—(a) *Lapsana communis.* (b) *Teucrium Scorodonia.* (c) *Clematis vitalba.* (d) *Spiræa* (garden species). (e) Cannot say without leaves. (f) *Mercurialis annua.* (g) *Epilobium parviflorum.* (h) *Circœa lutetiana.* (i) Send a specimen with ripe fruit. (j) *Euphorbia Peplus.*

T. Mitchell.—Cooley gives: "Levigated putty powder, $\frac{1}{4}$ lb.; burnt hartshorn, $\frac{1}{2}$ lb.; prepared chalk, 1 lb.; rose pink, 1 oz."

H. M. S. is recommended to inquire of some of the large shipping firms.

R. Wright.—Pereira's 'Selecta è Prescriptis,' or Ince's 'Latin Grammar.'

"*Ignorescens.*"—We cannot explain such an occurrence, except upon the supposition that there has been some accidental admixture.

IMPROVEMENTS IN PHARMACY.

MACKEY, MACKEY & CO. are Manufacturers of the **NEW SOLUBLE TRANSPARENT & PEARL COATED PILLS.**
These Pills possess numerous advantages over the Pills of other makers, amongst which may be specified—They never crack or split; the coating does not peel off; they are moderate in price; the ingredients are carefully selected and of unimpeachable quality; the coating is put on while the mass is soft, thus keeping the Pill in a perfectly soluble condition.
Pills of the Pharmacopœias and private formulæ as required.

MACKEYS' QUINQUININE.—An improved Preparation containing the pure Alkaloids of the Officinal Cinchona Barks, in many respects superior to the Sulphate of Quinine, at less price than Quinine.
"Sandwich, Kent.—Therapeutically Mackeys' Quinquinine equals Sulphate of Quininc. It is a certain tonic in direct debility, and a sheet anchor in all cases where fever remits or intermits.—THOS. HORNE, L.R.C.P., &c."
"Birmingham, 18th April, 1881.—Mackeys' Quinquinine is a good tonic, and agrees with the stomach better than the old Sulphate of Quinine.—J. POSTGATE, F.R.C.S."
Mr. F. OLDFIELD writes from Bloemfontein, S. Africa:—"Please send me Mackeys' Quinquinine, it suits here better than Quinine."

LIQ. CERII, Sedative Tonic. **LIQ. CERII CUM PEPSINA,** Tonic-Digestive. MISTURA CERII COMP., Tonic Stomachic, and Anti-Dyspeptic.
"Birmingham, 18th April, 1881.—The Mist. Cerii Co. is very valuable where there is a tendency to vomiting. I prescribed it in the case of a lady who had aborted every year for six years from the vomiting of pregnancy, with complete success; the vomiting was checked, and she is now near her confinement.—J. POSTGATE, F.R.C.S."

MACKEYS' MIST. BISMUTHI COMP. Tonic-Digestive. Dose 15 to 30 minims. A valuable remedy for indigestion, and any disorder of the stomach, in pyrosis and other internal malignant diseases, and for infantile diarrhœa.
"Mackeys' Mistura Bismuthi Co. is an improvement on other preparations of Bismuth, and is more acceptable to the stomach. I have found it a very valuable preparation.—J. POSTGATE, F.R.C.S., Birmingham, 18th April, 1881."

MACKEYS' PHOSPHORATED REFRESHING SALINE is the best Tonic Aperient known.

MACKEYS' CHLORODYNE.—Dr. M. BROWN writes: "I and my people like your CHLORODYNE very much, it is far superior to any other maker's."

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KRESYLINE.—Non-poisonous. Does not stain, and is not corrosive.

CHLOROMANGANESE.—A powder prepared from Permanganate of Lime and Chlorine. Specially recommended for mixing with substances which cannot be disinfected with liquids, for Cattle Trucks, Cattle Ships, Cow Stalls, &c.

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Secretary pro tem: Mr. JOHN MANLEY.
Temporary Offices: 20, KING'S ARMS YARD, COLEMAN STREET, E.C.

The great advantages which this Co-operative Association offers to Chemists and Druggists and the Medical Profession justify the Directors in inviting their attention to the Prospectus and explanatory letter, copies of which may be obtained *at once* on application to the *Secretary* or to the *Solicitor* of the Association.
Subscription Lists for the Share Capital will be opened in the course of September. Applications for Shares will be considered in the order in which they are received.

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CORN AND BUNION PLASTERS,
INVENTED AND ESTABLISHED BY
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SUPPLIED BY ALL WHOLESALE HOUSES.
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"Manna Cake"
THE SUBSTITUTE FOR CASTOR OIL. Bennette

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Price 1½*d. per Cake;* 12 *for* 1*s.* 3*d.; or, post free,* 12 *for* 1*s.* 6*d.;* 36 *for* 4*s.; Wholesale to the trade,* 12*s. per gross.*

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Certain Sudden **DEATH**
to all Grubs, Woolly Aphis, Green and Black Fly, Lice, Red Spider, Thrip, Mealy Bug, Caterpillars, Ants, Worms, &c.
FIR TREE OIL
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For destroying ALL INSECTS and PARASITES that infest Trees and Plants, whether at the Roots or on the Foliage. It cures Mildew and Blight on Fruit or Foliage, and a weak solution Kills all Vegetable Grubs, Turnip Fly, &c. Clears Grapes from Mildew or Mealy Bug without affecting the bloom. Thickened with a little clay, makes a good winter dressing. Destroys Lice and Fleas on Animals and Birds. Sold by Seedsmen and Chemists, 1s. 6d., 2s. 6d., and 4s. 6d. a bottle; per post 3d. extra. Per gallon 12s. 6d., or less in larger quantities.
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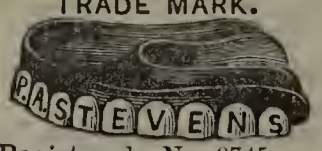

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The Favourite Summer Beverage; wholesome and refreshing. A Delicious Cooling Drink—Effectually Quenching Thirst.

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Prepared from the Lime Fruit. Is entirely Free of Alcohol. A Wholesome Family Beverage for Dinner or Supper Table.

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A Delicious Drink in Water—Effervescing in all Aerated Waters. An excellent Stimulant blended with Spirits.

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Director: Mr. W. SPENCER TURNER.

The present Session began on
MONDAY, AUGUST 18th,
as advertised.

Intending Students are requested to join without any further delay, as there are only a few vacancies.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. **47** out of **51** Pupils passed the last Examinations.

St. Thomas's Hospital Medical School,
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The WINTER SESSION of 1884-5 will commence on OCTOBER 1st, when an Introductory Address will be delivered by Sir J. Risdon Bennett, M.D., F.R.S., at 3 p.m.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

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Consulting Surgeons—Mr. Curling, F.R.S., Mr. Jonathan Hutchinson, F.R.S.
Physicians—Sir Andrew Clark, Bart., Dr. Langdon Down, Dr. Hughlings Jackson, F.R.S., Dr. Sutton, Dr. Fenwick, Dr. Stephen Mackenzie, Dr. Sansom, Dr. Charlewood Turner.
Assistant Physicians—Dr. Gilbart-Smith, Dr. Warner, Dr. Ralfe.
Surgeons—Mr. Couper, Mr. Rivington, Mr. Jas. Adams, Mr. Waren Tay, Mr. McCarthy.
Assistant-Surgeons—Mr. Reeves, Mr. Frederick Treves, Mr. C. Mansell Moullin, Mr. Hurry Fenwick.
Obstetric Physician—Dr. Herman.
Ophthalmic Surgeons—Mr. Jas. Adams, Mr. Waren Tay.
Physician to the Skin Department—Dr. Stephen Mackenzie.
Aural Surgeons—Dr. Edwd. Woakes, Mr. T. Mark Hovel.
Surgeon-Dentist—Mr. Barrett.

LECTURERS.

Medicine—Dr. Stephen Mackenzie.
Surgery—Mr. Rivington.
Operative Surgery—Mr. Rivington.
Practical Surgery—Mr. Reeves.
Anatomy—Mr. Frederick Treves.
Practical Anatomy—Mr. Mansell Moullin.
Physiology and Practical Histology—Mr. McCarthy.
Chemistry—Dr. C. Meymott Tidy.
Chemical Physics—Mr. F. J. M. Page.
Comparative Anatomy—Mr. C. Mansell Moullin.
Pathology—Dr. Sutton.
Midwifery—Dr. Herman.
Toxicology—Dr. C. Meymott Tidy.
Botany—Dr. F. Warner.
Medical Jurisprudence—Dr. Sansom.
Practical Chemistry—Mr. F. J. M. Page.
Materia Medica—Dr. Prosser James.
Diseases of the Eye—Mr. Jas. Adams.
Diseases of the Throat—Dr. Morell Mackenzie.
Diseases of the Ear—Dr. Edwd. Woakes.
Anatomy and Pathology of the Teeth—Mr. Barrett.

As Emeritus Professor of Surgery, Mr. HUTCHINSON will give in the Winter and Summer Sessions short Courses of Lectures in Clinical Surgery, consisting of Six Lectures each. The Special Subjects and the dates will be announced in due course.

The SESSION 1884-85 will commence on Wednesday, October 1st, 1884. The Prizes for the past Session and the Nursing Probationer's Prizes will be distributed by the Right Honourable the Lord Mayor, M.P., at 8 p.m., accompanied by the Lady Mayoress; after which there will be a Conversazione, to which all past and present students are invited.

Fee for Lectures and Hospital Practice, ninety guineas in one sum, or 100 guineas by three instalments.

The Hospital contains nearly 800 beds. Number of in-patients during 1883 was 7,976, out-patients 64,256.

THE RESIDENT AND OTHER HOSPITAL APPOINTMENTS are free to full students. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, and one Accoucheurship. Two Dressers and two Maternity Assistants also reside in the Hospital. The holders of all the Resident Appointments are provided with rooms and board entirely free of expense.

TWO ENTRANCE SCIENCE SCHOLARSHIPS, value £60 and £40, and TWO BUXTON SCHOLARSHIPS, value £30 and £20, will be offered for competition at the end of September to new students.

The Letheby Prize, value £30, for proficiency in Chemistry.

A Scholarship, value £20, in Human Anatomy and Physiology, to first year's students.

A Scholarship, value £25, in Anatomy, Physiology and Chemistry, to second year's students.

A Scholarship, value £20, in Clinical Medicine.

A Scholarship, value £20, in Clinical Surgery.

A Scholarship, value £20, in Clinical Obstetrics.

A Duckworth Nelson Prize, value £10 (biennial), in Clinical Medicine and Surgery.

The Hutchinson Prize, value £35 (triennial), in Clinical Surgery.

Prizes, value £60, to Dressers of Out-Patients in Minor Surgery.

Special entries for medical and surgical practice are made.

The London Hospital is now in direct communication by rail and tram with all parts of the metropolis, and the Metropolitan, District, East London, and South-Eastern Railways have stations within a minute's walk of the Hospital and College.

For prospectus and particulars apply personally or by letter to

Mile End, E. MUNRO SCOTT, Warden.

OWENS COLLEGE, MANCHESTER.

Prospectuses of the Pharmaceutical Courses in the Session 1884-5 will be forwarded on application.

J. HOLME NICHOLSON, Registrar.

The Dental Hospital of London

MEDICAL SCHOOL, LEICESTER SQUARE.

The WINTER SESSION will commence on Wednesday, October 1.

LECTURES.

Mechanical Dentistry—Dr. Walker, M.R.C.S., L.D.S., on Wednesdays, at 5 p.m., commencing on October 3.

Metallurgy in its Application to Dental Purposes—Professor A. K. Huntington, F.C.S., on Tuesdays, at 12 a.m., commencing October 7.

The SUMMER SESSION will commence in May, 1885.

Dental Surgery and Pathology—
on Tuesdays and Fridays, at 8 a.m.

Dental Anatomy and Physiology (Human and Comparative)—Mr. Arthur Underwood, M.R.C.S., L.D.S., on Wednesdays and Saturdays, at 8 a.m.

General Fee for Special Lectures required by the Curriculum, £15 15s.

DENTAL HOSPITAL OF LONDON.

Consulting Physician—Sir J. Risdon Bennett, M.D.

Consulting Surgeon—Mr. Christopher Heath, F.R.C.S.

Consulting Dental Surgeons { Mr. S. Cartwright, F.R.C.S. / Mr. John Tomes, F.R.S.

	Dental Surgeons.	*Assist-Dental Surgeons.*
Monday, 9 a.m.	Mr. D. Hepburn	Mr. L. Read.
Tuesday, ,,	Mr. R. Woodhouse	Mr. A. S. Underwood.
Wednesday, ,,	Mr. Gregson	Mr. Claude Rogers.
Thursday, ,,	Mr. Hutchinson	Mr. G. Parkinson.
Friday, ,,	Mr. Moon	Mr. Storer Bennett.
Saturday, ,,	Mr. F. Canton	Mr. Truman.

Chloroformists { Mr. Braine, F.R.C.S.; Mr. Bailey, M.R.C.S.; / Mr. T. Bird, F.R.C.S.; Mr. Mills, M.R.C.S.

Medical Tutor—Mr. W. B. Paterson, F.R.C.S., L.D.S.

Demonstrators—Mr. John Ackery, M.R.C.S., L.D.S., and Mr. W. Hern, M.R.C.S., L.D.S.

House Surgeon—Mr. S. Buckland, L.D.S.

Assistant House Surgeon—Mr. A. King, L.D.S.

The Medical Tutor holds Classes before each Examination. The Demonstrator attends each day.

The House Surgeon and Assistant House Surgeon attend daily while the Hospital is open.

On every day during the Lecture Session the Surgeons of the day will, if practicable, give Demonstrations, especially intended for the Junior Pupils, of the Operations performed in Dental Surgery.

The Saunders Scholarship of £20 per annum and Prizes are open for competition.

Fee for Two Years' Hospital Practice required by the Curriculum, £15 15s. Fees for Lectures and Practice, £31 10s. Additional Fees for a General Hospital for the two years to fulfil the requirements of the Curriculum vary from £40 to £50.

Further particulars may be obtained on application to the Dean, at the Hospital, where he will attend in the afternoons from September 26th to October 1st, inclusive, from 5 till 5.30 o'clock, or on Wednesday mornings from 10.30 till 12.

MORTON SMALE, Dean.

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SOUTH LONDON SCHOOL of PHARMACY

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Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

FOURTEENTH SESSION, 1883-4.

Entries now begun for the term commencing Sept. next.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

The Mason College, Birmingham.

SESSION 1884-85.

FACULTIES OF SCIENCE AND ARTS.

The SESSION will commence on Friday, the 3rd of October next.

All departments of the College are open to both sexes on the same terms. Special arrangements are made for the convenience of Ladies.

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GEO. H. MORLEY, Secretary.

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Pharmaceutical Preliminary	**Fee**	**10s. 6d.**
Pharmaceutical Minor	**Fee £1**	**1s. 0d.**
Pharmaceutical Major	**Fee £1**	**1s. 0d.**
Medical Preliminary	**Fee £1**	**1s. 0d.**

TESTIMONIAL.

BUCKLEY HOUSE, LLANDUDNO,
March 10th, 1884.

GENTLEMEN,

Your excellent system of College training and valuable Postal Lectures have gained a well deserved repute, yet I gladly testify to the entire satisfaction I have felt in going through both one and the other.

Your course of teaching is so thorough, and your efforts to assist and wisely direct every student so unremitting, as to call for the highest praise.

I am, Gentlemen,

Yours very truly,

M. A. S.

The original of this and numerous other Testimonials may be seen at the Office.

For full particulars apply to Messrs. WILLS & WOOTTON, Trinity Square, London, S.E.

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Mr. JAS. W. SAUNDERS

(*From the Royal School of Mines*),

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STUDENTS REASSEMBLED SEPTEMBER 3rd.

Notwithstanding the great mortality at the June and July Minors, over seventy-five per cent. of my students were successful at the two combined. Individual personal instruction, as usual. No demonstrators. All students work *separately*, therefore entry may be made at and for any length of time. Postal teaching for Preliminary and Minor a speciality; books unnecessary, notes sufficient. Send stamp for terms, &c.

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Laboratory and School Buildings:

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The School re-opened on Tuesday last, September 2nd, at Ten o'clock, and the usual Lectures commenced on Wednesday, September 3rd. Students who intend joining the classes are particularly requested to give immediate notice, the number of entries being already unusually great. Fees for attendance to the October examination, £6 6s.; for attendance to the December examination, £10 10s.; or for the entire session, £21.

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Messrs. LUFF & WOODLAND.

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MATERIA MEDICA

AND

PRACTICAL PHARMACY

BY

Mr. J. B. L. MACKAY.

Quadruple Medallist and Hill's Prizeman of the Pharmaceutical Society; and one of the staff at the Royal School of Mines.

Commencing Wednesday, October 1st, from 8 to 10 p.m., and held weekly till May, 1885. Fees £1 for each Course. Apply for full particulars (gratis), or Syllabus (price 4d.), at the Library of the Institution.

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SCHOOL OF PHARMACY.

36, Oxford Street, Liverpool.

Principal: J. S. WARD, Ph. Ch., M.P.S.
(*Prize Medallist and South Kensington Prizeman.*)

The next session will commence on Monday, September 1st, with Two Courses of Lectures, one for the October candidates, and the other a full course extending over until the December Examination.

Three out of Four of those who have passed from this School at the recent Examinations have been successful on their first attempt.

A new Prospectus, with full particulars of the School premises, curriculum, fees and testimonials, will be forwarded on application.

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WESTMINSTER COLLEGE

TRINITY SQUARE BOROUGH, LONDON, S.E.

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FEES:—

To the October Examination	...	£5 5s.
To the December ,,	... ...	£8 8s.
Six Months' Course ...	... ...	£10 10s.
Twelve Months' Course	... ...	£15 15s.

At the Pharmaceutical Examinations held in July, the following 29 Students of the Westminster College were successful in passing the MINOR Examination:—

*Mr. A. BANKS	Mr. R. M. LEWIS
* ,, W. BARKER	* ,, C. O. MORRISON
* ,, T. N. BROOKE	,, G. MOOR
,, B. H. BUTLER	,, G. NEALE
,, W. CLARKE	,, J. NEWTON
,, C. ELLIS	,, F. ROOKLEDGE
,, H. C. GLANVILLE	,, F. T. SANDERS
,, W. H. GODSLAND	,, B. SMITH
* ,, E. E. HALL	,, J. STURDY
,, J. H. HOPPER	* ,, W. SUMNER
,, A. J. HEMSTEAD	,, T. E. TAYLOR
* ,, J. HULLAND	,, A. WALDRON,
* ,, S. HUGGINS	,, H. P. WITHERS
* ,, G. JACQUES	,, H. E. YOUNG
* ,, J. K. JONES	

PRELIMINARY.

*Mr. R. COLWILL *Mr. N. COUVE
Mr. A. T. RILEY.
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MR. JUDD'S CLASSES
MINOR AND PRELIMINARY.

The Morning Class for the October Exam. began on the 1st Monday in September.

Resident and non-resident pupils can be received at any time for the October Minor and Preliminary.

Evening Classes from 7.30 to 10 o'clock. *Advanced* Minor on Monday and Thursday. *Intermediate and Elementary* on Wednesday and Friday. Preliminary Class on Tuesday, at 7 p.m. Preliminary Classes also on Tuesday and Friday afternoons, at 2.30. Successes are scored from these classes at each Minor and Preliminary Exam.

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West Central School of Pharmacy,
31, REGENT SQUARE, W.C.

ENGAGEMENTS WANTED.

AS JUNIOR or DISPENSER to a Surgeon. In-door. Good Dispensing and Retail experience. London preferred. Age 21. GEO. J. COOMBS, 73, Newborough St., Scarborough.

LOCUM TENENS. Highest references. Disengaged Sept. 8th. FRANK HOAD, A.P.S., Merton Villa, Beulah Rd., Tunbridge Wells.

AS JUNIOR or IMPROVER. Now disengaged. Can Extract Teeth. 3 years' experience. Age 21. No salary required for the first 3 months. Good reference. W. J. K., Howden Lodge, Norton, near Stockton-on-Tees.

ADVERTISER requires post as MANAGER. Has had first-class experience in a leading West End firm. Good refcrences. Qualified. A. P. S., 30, Thorngate Rd., St. Peter's Park, W.

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TEMPORARY engagement (qualified), on reasonable terms, can be arranged immediately, in town or country. Long experience and excellent references. W. C. TAYLOR, 70, St. Stephen's Avenue, Shepherd's Bush, W.

AS MANAGER or SENIOR, with view to partnership not objected to, in a good house of business. Age 30. Qualified. Town and country experience. MINOR, 65, Tabley Rd., Tufnell Park.

AS LOCUM TENENS or Temporary MANAGER. Would not object to permanency. Age 30. Minor qualification. Town and country experience. ASSOCIATE, 33, Reedworth St., Kennington Park, S.E.

EVENING Employment, by a Chemist's ASSISTANT, possessing a thorough knowledge of Dispensing and the trade generally. Terms very moderate. CHEMIST, 62, Waterloo Bridge Rd., S.E.

AS MANAGER of Branch or out-door SENIOR. Thoroughly trustworthy. Competent Dispenser and Prescriber. Qualified by Exam. London and provincial experience. A permanency desired. A. P. S., Mr. Sunley, 237, Goswell Rd., London.

AS MANAGER. London and provincial experience. Competent Dispenser and Prescriber. Qualified. Highest references. Permanency desired, or temporary till suited. Disengaged September 9th. Age 38. MANAGER, 96, Marchmont St., W.C.

LOCUM TENENS.—Advertiser disengaged from September 8th. Thoroughly experienced. Good Prescriber. A., 36, Blair St., East India Rd., E.

MANAGER of Branch or out-door ASSISTANT. Age 24. Height 6ft. Married. Abstainer. 8 years' experience. Can undertake Prescribing, Dentistry, and Minor Surgery. W. GOODWILL, Westboro', Scarborough.

AS ASSISTANT, by Minor student, wishing experience in Dispensing. Good references. Salary not so much an object as comfort. Age 26. R. T., 27, Dorchester Pl., Blandford Sq.

AS Temporary MANAGER, by a competent man, of great experience and good character. Disengaged. CHEMICUS, 23, Trippett, Hull.

BY a respectable Youth, in Warehouse, or as PORTER. 4 years' good reference. Age 17. W. G., 106, Ashford Rd., Eastbourne.

AS ASSISTANT. Age 24. Height 5ft. 8in. 8½ years' experience. Minor qualification. W. H. MILLER, Howden, E. Yorks.

ENGAGEMENTS WANTED.

AS ASSISTANT. Age 25. Height 5ft. 9in. Can Dispense, Prescribe, Extract Teeth; have also a thorough knowledge of Homœopathic Pharmacy. CARBO, 6, Paris St., Lambeth Palace Rd., S.E.

AS DISPENSER to Surgeon, or ASSISTANT in first-class Dispensing business. 7 years' experience. First-class references. London preferred. Time for study. ALPHA, 78, High St., Godalming, Surrey.

BY a Pharmaceutical Chemist, with first-class town experience. As ASSISTANT. Age 24. Disengaged. C. G. C., 19, Pepper St., Chester.

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AS JUNIOR. Accustomed to good class business. Age 19. Height 5ft. 9in. 3 years' experience. Passed Prelim. Can speak French, acquired abroad. Good references. CHLORAL, Sutton & Co., 10, Bow Church Yd., E.C.

AS ASSISTANT, or to MANAGE a Branch, or LOCO. TENENS. Good references. Moderate salary. Mixed Country trade. ANTHEMIDES, M. A. L. Hall, Winchcombe, Gloucestershire.

AS SENIOR or Branch MANAGER in good Dispensing business. Age 27. Height 5ft. 7½in. Minor qualification. Married. Highest references. R. K., Mr. Hornby, Chemist, Darwen.

AS LOCUM TENENS or MANAGER, by a Pharm. Chemist, with first-class experience and highest references. Disengaged on the 14th inst. BETA, Mr. Burke, William St., Windsor.

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AS Junior ASSISTANT in good class Dispensing business, out-doors. 5 years' experience. Salary £70. Age 23. Height 5ft 11in. F. W., 3, Marine Ter., Walton-on-Naze.

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BY a French Pharmacist in London. Age 20. 5 years' experience. Can speak German. Good references. Mr. SIGRIST, Chez Mr. Leister, 45, Rue de Laborde, Paris.

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AN English ASSISTANT, with some knowledge of French and French Pharmacy. Apply to G. JOZEAU, 49, Haymarket.

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IMMEDIATELY.—An ASSISTANT in a Prescribing, Dispensing and Retail business. Highest references required. Applications not answered in three days may be considered declined. Apply, with full particulars, to T. H. SMITHSON, 93, Walworth Rd., London. S.E.

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E. MATCHAM, Homœopathic Chemist, Ipswich, requires a good Junior ASSISTANT. Unexceptional references. Full particulars, enclosing carte (to be returned). Out-door.

IMMEDIATELY.—A competent ASSISTANT, of gentlemanly address. Accustomed to good-class Dispensing business. State height, salary required, with all particulars. Apply, to G. R. WARREN, 79, Abbey Rd., St. John's Wood, N.W.

A RELIABLE JUNIOR, accustomed to Mixed country business, with Dispensing counter, Prescribing, &c. Must be a good Salesman, energetic and obliging, with good address. State full particulars, references, and enclose photo., if convenient, to RANDAL HOW, Chemist and Dentist, 26, St. Clement's and 192, Cowley Rd., Oxford.

AT once—An active, obliging and gentlemanly ASSISTANT, between 30 and 45 years of age. Must have a thorough knowledge of Prescribing, good Counterman and well up in Dispensing. Good salary, or would give share in business. BELL, CHESHIRE & ASHTON, Chemists, 378, Cold Harbour Lane, Brixton.

AN ASSISTANT, to Manage a Branch Drug business. State full particulars, salary required, in-door or out-door, enclosing carte (to be returned), when disengaged, to H. J. THOMAS, 13, De la Beche St., Swansea.

A DISPENSER, for a first-class business on the South Coast. Apply, by letter only, stating age, height, salary, and last situation, to Mr. EVE, Plough Ct., 37, Lombard St., E.C. Applications not answered within three days are declined.

A JUNIOR ASSISTANT, accustomed to a good Retail and Dispensing business. Apply, stating age, height, salary, and references to JUNE, High St., Ledbury.

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Those for Businesses for Disposal, &c., will be found on page xix.

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 742.] SATURDAY, SEPTEMBER 13, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
International Exhibition of Forestry at Edinburgh	201
The Preparation of Daturine. By Dr. J. D. A. Hartz	203
Pharmacy in Brazil	204
EDITORIAL ARTICLES AND NOTES:—	
Cinchona Cultivation and Alkaloid Manufacture in Bengal	205
Pharmacy in the French Navy	206
Notes:—A New College of Pharmacy in Melbourne—The Use of the Word "Patent" on Labels—The Gelsemium Poisoning Case — A Fatal Joke—Visit to a Rhubarb District —Hops in New Zealand — Perfumery Industry in Florida	207
BRITISH PHARMACEUTICAL CONFERENCE:—	
The Pungent Principles of Plants. By Dr. Thresh	208
Note on a Specimen of Mylitta Australis. By W. Southall, F.L.S.	210
Note on Certain Anhydrous Essential Oils. By J. Williams	211
Tincture of Quinine. By R. Wright	214
Note on China Bicolorata or Teeamez Bark. By J. Hodgkin, F.I.C., F.C.S.	217
Analyses of Some Old Cinchona Barks. By D. Hooper, F.C.S.	218
Sesame Oil as a Basis for Lead Plaster. By T. Maben	219
OBITUARY	220

Pharmaceutical Society of Great Britain.

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, October 1st, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

The Sessional Prizes and Certificates will be distributed at this Meeting. An Address to the Students will be delivered by

W. T. THISELTON DYER, C.M.G., M.A., F.R.S., F.L.S.,
Assistant Director of the Royal Gardens, Kew.

All Students and Friends, ladies as well as gentlemen, are invited to be present.

LIBRARY AND MUSEUM.

SPECIAL NOTICE.

The Library and Museum will not be open in the evening during September.

PRELIMINARY EXAMINATION.

This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

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Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
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Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

NORTH BRITISH BRANCH.

The Society's Rooms at 119A, George Street, Edinburgh, are closed, and the new premises at 36, York Place, Edinburgh, will be opened on Wednesday, October 1st.

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On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratories.

At 8 p.m. on Wednesday, October 1st, the School Prizes will be distributed and an Address to the Students will be delivered by W. T. THISELTON DYER, C.M.G., M.A., F.R.S., F.L.S., *Assistant Director of the Royal Gardens, Kew. All Students and Friends, ladies as well as gentlemen, are invited to be present.*

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Those for Businesses, Assistants, Engagements, &c., will be found on page XVII.

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AËRATED WATERS,

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We are now preparing the above, which are **the only Oval Gelatine Coated** or **Capsuled Pills of English Manufacture** at present in the market. We are also issuing a **Special List**, devoted exclusively to the above, and which will be supplied on application.

All our pills are sent out in capsuled bottles containing one gross; but, **for the convenience alike of Physicians and Pharmacists, we have originated the method of putting up small bottles (each containing 24 pills) to meet the requirements of a single prescription.**

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Manufacturers of all descriptions of Pharmaceutical Preparations,

Beg to inform Merchants, Shippers, &c., that all Indents entrusted to them will receive careful attention and prompt execution.

Messrs. B., S. & Co. request the attention of their friends and the Trade, at home and abroad, to their having PURCHASED THE BUSINESS of Messrs. JAMES BASS & SONS, Hatton Garden, and with it the various formulæ from which their Special Preparations have been made, and pledge themselves to supply them in all their integrity.

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Are combinations of FRY'S PURE COCOA EXTRACT and CHOCOLATE PASTE with ALLEN & HANBURYS' CONCENTRATED EXTRACT of MALT, affording delicious beverages. The Extract may be most agreeably taken in either of these forms. Sold in tins at 1s. and 2s. each, 9s. and 18s. per dozen. The COCOA is in the form of Powder, the CHOCOLATE of PASTE, and sweetened.

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CRYSTAL PALACE BOND'S GOLD MEDAL MARKING INK.

(Prepared by the Daughter of the late John Bond.)

13 PRIZE GOLD AND OTHER MEDALS AWARDED.

CAUTION.—In ordering from the wholesale house, please state Crystal Palace Bond's (Daughter's) Ink is required. Kindly examine each parcel received, as complaints are daily made of other inks being substituted.

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The attention of the Trade is respectfully called to the above Article, now having a large sale, and giving an excellent profit to the retailer.

5/6 size - - - - - - - - 36/- per Dozen.
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THE NEW BLACK INK, different from anything else ever produced.

Writing becomes a pleasure when this Ink is used. It has been adopted by the principal Banks, Public Offices, and Railway Companies throughout Ireland.

It writes almost instantly Full Black.
Does not corrode Steel Pens.
Is cleanly to use and not liable to Blot.
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Blotting-paper may be applied at the moment of writing.

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MAY BE HAD ON APPLICATION TO THE PUBLISHERS,

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Those for Assistants Wanted, Businesses for Disposal, &c., will be found on page xvii.

Hunyadi János

CAUTION.—Circumstances which have come to the knowledge of Andreas Saxlehner, Buda Pest, Sole Proprietor of the Hunyadi János Spring, compel him to WARN the British Public against SPURIOUS IMITATIONS. To secure genuineness, purchasers should see that every bottle has on the LABEL the name of

"THE APOLLINARIS COMPANY (LIMITED) LONDON."

Apollinaris

A POSITIVE CURE FOR STOMACH, LIVER & KIDNEY AFFECTIONS.

The Only Palatable Natural Aperient Water.

THE BEST HOUSEHOLD REMEDY & SPECIFIC FOR CONSTIPATION

Highest Award at the International Medical Exhibition, 1881. Retail 1/6 & 2/- per Bottle.

A SUPPLY OF CIRCULARS WITH NAME AT FOOT AND DESCRIPTIVE PAMPHLETS FREE ON APPLICATION.

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It is prescribed by all the leading Medical Men.

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We beg to inform our numerous customers, and the Trade generally, that we are WITHDRAWING THE 4-oz. AND 10-oz. DISPENSING sizes, and, instead, are putting up AN 11s. RETAIL SIZE. The wholesale price of the 4*s.* 6*d.* and 11*s.* will be at the same rate per oz. as the old 4-oz. and 10-oz. We shall still continue the undermentioned as usual.

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As originally introduced by A. P. Towle, and free from stamp duty for dispensing. 4 ozs., 4*s.*; ½ lb., 5*s.* 6*d.*; 1 lb., 10*s.* Also in quantities of 6 lbs. and upwards at special quotations.

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In 1, 2, and 4 lb. bottles, at 3*s.* per lb., and 6*d.* and 1*s.* boxes. Foiled, lined, and neatly got up for the counter, 4*s.* 6*d.* and 9*s.* per doz. Quantities of 7 lbs. of Lozenges and upwards stamped with chemist's own name free of charge.

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Show Cards and Bills with name on application with instructions for forwarding.

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These Preparations received a FIRST-CLASS AWARD (the Highest Obtainable), at the INTERNATIONAL MEDICAL AND SANITARY EXHIBITION, SOUTH KENSINGTON.

LIQUOR PANCREATICUS (BENGER)—For the Preparation of Peptonised or Artificially Digested Food. Bottles, 2s. 6d., 4s. 6d., and 8s. 6d., with full directions.

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Of all leading Wholesale and Retail houses.

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MOTTERSHEAD & CO. Pharmaceutical Chemists,

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PURE SPIRITS OF WINE.

TO WHOLESALE DRUGGISTS, CHEMISTS, PERFUMERS, &c.

E. BOWERBANK and SONS

Are now supplying *Sp. Vin. Rect.*, extra and first qualities, at a very low figure for cash; free from smell, and perfectly clean; for exportation likewise.

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NAPHTHA at current market rate.

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Is used by all the principal Wholesale Druggists, Pharmaceutists and Perfumers in town and country (54° to 65°), and will bear testing with Ammonia. It is allowed to be the best article out for making Tinctures, Essences, and the most delicate Perfumes, being perfectly free from smell and Füsil Oil. Can be obtained through Druggists with E. B. and Sons' name and label on bottles, &c.

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The Favourite Summer Beverage; wholesome and refreshing. A Delicious Cooling Drink—Effectually Quenching Thirst.

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Prepared from the Lime Fruit. Is entirely Free of Alcohol. A Wholesome Family Beverage for Dinner or Supper Table.

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The Perfection of Fruit Beverages. Delicious, Cooling and Refreshing in Water—Effervescing in all the Mineral Waters

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The Favourite Beverage for Lunch, Dinner or Supper Parties. Eminently Wholesome. No table should be without it.

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The favourite Temperance Beverage; Delicious, Cooling and Refreshing. Entirely Free of Alcohol. Eminently Wholesome.

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An excellent Substitute for the Lemon as a flavouring in Summer Drinks, Claret Cups, &c. Cooling and Refreshing.

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The Family Dinner Table has additional attractions when supplied with Rose's Lime Juice Cordial in water.

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Sold everywhere. As a protection against imitations, Purchasers should order "ROSE'S LIME JUICE CORDIAL."

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It has been decided in various Chancery Suits that ROSE & CO., LONDON, are the original introducers of LIME JUICE CORDIAL.

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CRYSTAL SPRINGS

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Manufacturers of Chemicals and all Pharmaceutical Preparations,

Chemical Analysis of every description promptly conducted.

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A palatable refreshing saline and mild aperient. The Caffeine it contains renders it well adapted for the treatment of sick or bilious headache. If taken in the morning it acts as an agreeable substitute for seidlitz powders. *In ½ lb. and 1 lb. Bottles. Price 3s. 6d. per lb.*

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A reliable remedy for the prevention of Sea Sickness and for the relief of other forms of sickness—especially that of pregnancy.

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White Fittings, 30/- per gross.
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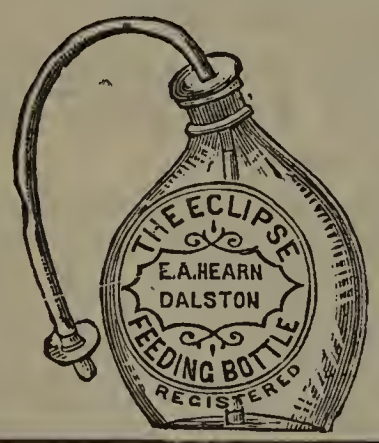

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Fitted with Best Glazed Earthenware Caps.

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White Fittings, 84/- per gross.
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DELECTABLE JUJUBES, VOICE JUJUBES, AND GLYCERINE PASTILLES,

Put up in 4-lb. Decorated Tins with Glass Lids, *TINS FREE*, are now being inquired for by buyers from all parts of the world. They are not surpassed in quality by any maker, and give entire satisfaction.

MEDICATED AND HIGH-CLASS LOZENGES, of every kind,

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ACID DROPS & BEST QUALITY BOILED SUGARS of EVERY KIND

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PENNY SUGAR WORM CAKES, suitable for either *children* or *adults*. Have an immense sale, keep in any climate, and please everybody. Manufactured by

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FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of

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Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

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His **FLUID CAMPHOR** is a valuable remedy for Sleeplessness and Weak Nerves.
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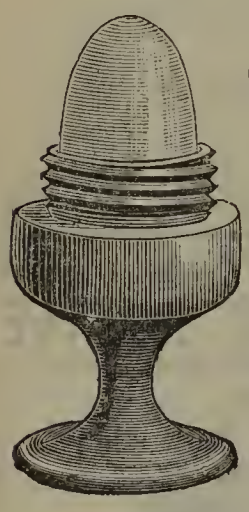

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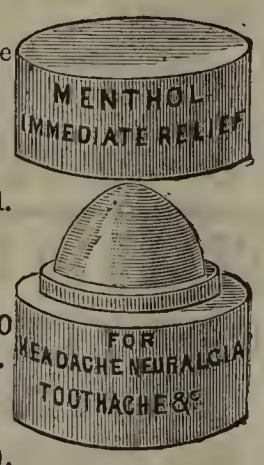

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Proprietors of MYOCOM FLY GUM, *in tins at* 1/-, 2/6 *&* 5/- *each.*

DINNEFORD'S FLUID MAGNESIA.

Perfect in Purity and uniform in Strength.

"Dinneford's Solution may fairly be taken as a type of what the preparation ought to be."—*Pharmaceutical Journal.*

Sold by all Wholesale Druggists, and by the Manufacturers,

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For Shop Fronts, Fittings, and Fixtures of every description,

TRENT BROS.,

MEDICAL AND GENERAL SHOP FITTERS,
5 to 11, Baker's Row, London, E.
Plans and Estimates free.

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MANUFACTURERS OF

W. B.'s PUREST LIQ. AMMONIA, ·880.

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Free from "Common Salt," which is found in most of the articles now sold.

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W. B.'s Purest Treble Sublimed Carbonate of Ammonia (Lump and Ground).

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Now largely used in perfumery as a substitute for the Mitcham Oil. *Price* 21s. *per lb. of*

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LICENSED MAKERS

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WHOLESALE DRUGGISTS,

23 & 24, REDCLIFF STREET, BRISTOL,

Who offer the same in tins and casks, and can supply best Rectified Spirits of Wine in quantities of two gallons and upwards.

To Dealers in Homœopathic Medicines in all parts of the world. You can double your profits by introducing

HOMŒOPATHIC

ABSORBENT WAFERS

(REGISTERED,)

For administering Tinctures of all dilutions without the inconvenience of dropping, or the necessity of water. Directions enclosed, in any language.

Introduce these wafers and confer a boon on thousands who prefer tinctures but for the inconvenience of dropping. Chemists in India and the Colonies should order a gross pareel in next consignment, which may be had from any Wholesale House, or direct from the Sole Proprietors and Manufacturers, CONYNGHAM & Co., 11, Upper Baggot Street, Dublin.

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PRIZE MEDAL 1862.

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These FATS, *being absolutely* PURE, *and free from* SALT, CHEMICALS, *or* WATER, *are*
SPECIALLY ADAPTED FOR
PHARMACEUTICAL, PERFUMERY, *and* CULINARY *purposes.*

Manufacturers of MUSK, GLYCERINE, ROSE, BROWN WINDSOR, BRAN, TAR, SKIN, TOILET, ELDERFLOWER, OATMEAL, HONEY, ALMOND, and all other kinds of **FANCY SOAPS**, in Squares, Tablets, or Bars. VIOLET POWDER, POMADES, COSMETIQUES, &c.

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WHOLESALE AND FOR EXPORTATION.
ESTABLISHED OVER HALF A CENTURY.

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PANCREATIC EMULSION

OR PANCREATISED (PREDIGESTED) FAT,

Largely prescribed as the special form of nutriment essential

IN ALL CASES OF

Consumption, Wasting, Loss of Appetite, Strength, and Digestive Power.

The special advantage of Pancreatic Emulsion is that it provides the NATURAL STABLE SOLID FATS OF FOOD, predigested by the action of the pancreatic secretion, so that they can be taken without the least disturbance of the digestive functions. As it provides SOLID fat, it is well to make it alternate with a liquid fat, like cod-liver oil, even where the latter agrees, and in many cases where cod-liver oil disagrees it may be permanently substituted with the greatest advantage, or it may be taken with the oil, the assimilation of which it actively promotes.

The Emulsion is of the consistence of Devonshire cream, easily miscible with fluids, and quite unobjectionable in taste. It may be given in milk or water, and with the addition of a little wine or brandy if desired.

In Bottles, 2s. 6d., 4s. 6d., and 8s.

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THOMAS'S TINCTURE OF STEEL

Strongly recommended by the most eminent physicians as being the most agreeable, reliable, and stable solution of Iron ever offered to the public.

FOR PRICE LISTS APPLY TO

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SAVARS CUBEB CIGARETTES.

Cubebs Stramonium and Cannabis Ind, (soothing). Relief in Asthma, Throat Cough, Bronchitis, Influenza. A specific against fogs. Boxes (12) 1s., 9s. per doz.; (36) 2s. 6d., 24s. per doz. Full directions. EVANS, LESCHER & WEBB, London. EVANS, SONS & CO., Liverpool. Samples gratis, post free.

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GENUINE MALT EXTRACT

Strongly recommended by the most distinguished Medical Authorities, and being considered a Preparation of the highest merit, is not to be confounded with other makes of the same and similar descriptions.

Chemists introducing the above to their Customers, and particularly to the Medical Profession, will find this Preparation of Malt so highly appreciated as soon to command a constant sale.

Sole Consignees for the United Kingdom, R. BAUR & CO., LONDON.

Retail Price, 2s. 3d. per large bottle (one size only kept).

Two of the Analyses of Dr. Linck's Malt Extract.

By DR. ARTHUR HILL HASSALL, Senior Physician to the Royal National Hospital for Consumption, Author of *Food and Its Adulterations*, &c.—"My analysis proves that this Extract is pure, is prepared with very great care, and will be employed with success. Composition: 23 per cent. Water; 35 per cent. Dextrine; 36 per cent. Sugar."

By DR. HOPPE-SEYLER, Professor of Physiological and Pathological Chemistry at the University of Strassburg.—"I have received for analysis Dr. Linck's chemically pure Malt Extract. The analysis shows that the same contains 33 per cent of Sugar, 36 per cent. of Dextrine, only a trace of Lupulin, a small quantity of Phosphate of Magnesia (contained in the malt), and a few traces of Albumen. It is entirely free from any injurious ingredient. I therefore consider the same a *very useful preparation* and an *excellent nutritious agent*."

THE VERDICT.

THE LANCET reports of the Kepler Extract of Malt: "*The best known*, and *in this country the largest used Extract of Malt.* It is as distinct an advance in therapeutics as was the introduction of cod liver oil.

Professor Yandall, M.D., of Louisville, U.S.A., reports of it:—"The Kepler Extract of Malt is the best, and has the finest flavour of any I have seen; it is a very valuable preparation."

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"The Kepler Malt, combined with Cod Liver Oil, is the most palatable and easily digested of any form we have yet seen for administering Cod Liver Oil."

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INTERNATIONAL FORESTRY EXHIBITION AT EDINBURGH.

The importance of the study of Forestry to the nation at large, and indirectly to pharmaceutical chemists, is best illustrated by a reference to the results obtained in India, Jamaica and Ceylon, where the cultivation of the cinchona has become a prominent industry. It is largely owing to the strenuous endeavours made by the pioneers of the Forestry Department in India that the valuable febrifuge alkaloids of cinchona bark are now brought within the reach of even the very poor in India.

But many other remedies used in medicine besides cinchona are forest products, and the visitor to the International Forestry Exhibition now being held in Edinburgh need not be surprised to find that drugs form a prominent feature in several colonial departments. It is proposed, therefore, to give in these columns some account of the principal drugs exhibited and of such products as seem capable of being more extensively used if better known.

Taking the exhibits in the order in which they will be seen by visitors to the building, the first to be noticed are Stands Nos. 31 and 32, where the forest products of—

The Gambia and Sierra Leone

are shown. These are naturally somewhat similar in character, and as those from the Gambia are accompanied by a very voluminous report, from Captain C. A. Moloney, C.M.G., the Governor of that colony, relating to the products of Sierra Leone as well, the products of the two provinces can be most conveniently treated of together. Much information concerning these exhibits has been derived from the above-mentioned report.

The chief articles of export from Gambia which can be classed as drugs are palm kernels, palm oil, indiarubber and camwood. From Sierra Leone, in addition to the above, there are exported ground nuts (*Arachis hypogœa*), copal, Benne seed (*Sesamum indicum*), ginger and red pepper, and in lesser quantity Calabar beans, melon seed, arrowroot and Shea butter. Of these Shea butter can scarcely be called a native product, being produced much more abundantly on the banks of the Niger, and melon seed, which is used as food in Gambia under the Mandingo name of "sarroh," appears to be imported from Abbeokuta. The latter is, however, also exported from Sierra Leone, to a limited extent (£139 in 1882). The seeds yield about 30 per cent. of a pale limpid oil, which dries slowly. It has been shipped to France, but seems unknown in this country as a commercial product.

The specimens of palm from Gambia include the ordinary yellow kind and white and black palm kernel oil. The yellow oil is obtained from the fleshy pulp of the drupaceous fruit, and the kernel oil from the seed. The manner in which these oils are obtained is described in Captain Maloney's Report and may be summarized as follows:—

The Yellow Oil.—The bunches of fruit are allowed to dry for a week or ten days in the air, until the fruits can easily be detached by beating, when the scales at the base of the fruits are removed by rubbing them in the hands in a windy place, by a rough kind of winnowing. The nuts are then buried in a hole in the earth about four feet deep and lined with plantain leaves, in which they are allowed to remain until the pulp is as soft as if boiled, which is in from three to twelve weeks. The fruits are then removed to a similar hole in the ground lined with flat stones and beaten with wooden pestles till the flesh is removed from the fruit stones. Portions of the mass are now boiled in water, the fruit stones being removed, until the oil runs out. The marc is then pressed in cylindrical nets twisted by means of sticks inserted at the ends.

The process of fermentation in the ground injures the quality of the oil, and the shorter that process the sweeter and more liquid the oil.

For home consumption the natives make a better preparation by boiling the fruits in iron pots instead of fermenting them, then working the pulp into a paste with tepid water, passing it through a sieve and boiling it with water until a bright red oil floats on the surface. It is then strained and heated to drive off any water it may contain.

Palm Kernel Oil.—The white oil is prepared from the kernels. To obtain these the stones or endocarps are allowed to dry until the kernels become so tough that they are not crushed when the shells are broken between two stones. The kernels, after removal from the shells, are pounded in a mortar, then ground more finely between grinding stones, and the resulting mass put into cold water and stirred with the hand until a straw coloured oil rises to the surface in lumps; this, on exposure to light and air, becomes perfectly white.

The black oil is obtained by heating the kernels in a frying pan, when the oil runs out and is collected and strained. It has an empyreumatic odour and is not easily decolorized; hence it is of little value.

Specimens of the wooden mortars and pestles used for the purpose of pounding the seed are also exhibited. In size and shape they resemble a large iron mortar. They are made from a hard wood known as "gree-gree."

The palm trees are said to commence bearing when from seven to twelve years old and to yield during thirty-five or forty years. A single tree affords 20 pounds of the fruit during each season, when in full bearing, the size and fruitfulness of the tree being dependent, however, upon the nature of the soil. The harvest is chiefly collected during the rainy season. Several varieties of the oil palm are known on the Gold Coast under the names of, royal, white, red and black palm, differing chiefly in the character of the fruit.

Some idea of the importance of this industry to the West African Colonies may be gathered from the fact that the exports in 1882, from Sierra Leone alone, were, palm nuts, £101,165, palm oil, £47,217, besides larger quantities from the Gold Coast, the total imports of nuts and oil into the United Kingdom being estimated during the same year at £484,309.

Specimens of the oil of the ground nut (*Arachis hypogœa*) of native manufacture are placed side by side with others imported from this country and France and compare favourably with the latter, both as to colour and brilliancy. The amount of nuts (botanically legumes) exported from Sierra Leone in 1882 was valued at £15,217.

The Benne seed (*Sesamum indicum*) exhibited is the white variety. This seed, which yields Gingelly oil, appears to be exported almost exclusively to France, and although some comes back to the colony in the form of oil, it does not appear to what purpose the larger proportion of oil is applied. The value of these seeds exported from Sierra Leone in 1882 was £10,002.

A white fatty oil is also exhibited together with the fruit *Hyphæne crinita*? known in the Jolof language as "sippe," and in the Mandingo as "kalo." This solid fat is stated to be used for cooking purposes; and the pulp of the fruit is eaten by the natives. The kernel of the fruit is hard and horny, like that of the vegetable ivory nut (*Phytelephas*

macrocarpa) and gives no evidence, in the state in which it is exhibited, of containing any oil.

The Tooloucoonah or Coondee seeds (*Carapa guineensis*) and the oil obtained from them are also shown. This oil is worthy of note as a product which might be developed into an important industry, as the seeds could be obtained in unlimited quantity. In French Guiana, where the tree also grows, the seeds are said in some places in the forest to cover the soil a foot deep. The oil makes excellent soap, and is said to be valuable as a lubricant, protecting iron and steel from rust in a remarkable degree. It is used in British Guiana under the name of crab oil, and is employed to anoint the person in order to keep off the mosquitoes, for on account of its intense bitterness it repels all insects. A soap made from this oil might possibly serve the same purpose if used in washing. In this country the oil is a soft solid. Although Tooloucoonah oil was awarded a prize in the International Exhibition of 1851, it seems to have been undeservedly neglected. The kernels are valued in the Gambia at about two shillings a bushel.

Some interesting specimens of indiarubber are exhibited, both from the Gambia and Sierra Leone. The latter are accompanied by specimens of the leaves and stems of some of the plants yielding it. In the Gambia indiarubber is comparatively a new industry, the exports having only commenced in 1882, when their value reached only £114. The quality of the first export was so good that in 1883 the amount had increased to £5107, the greater proportion of which was taken by France. The adulteration practised by the natives in consequence of the increased demand led, however, to a subsequent decline in its value and in the trade. In Sierra Leone, however, it forms one of the principal articles of export, being estimated in 1882 at £126,806.

In Captain Moloney's Report some interesting notes on the production of rubber have been collected together, from which it appears that—

"The milk of different rubber trees varies considerably in fluidity and physical properties. In the case of *Landolphia florida* the juice dries so quickly that it forms a ridge on the incision. The natives, therefore, make long cuts and wipe the juice off with their fingers as it exudes, and smear it on their arms and shoulders until a thick coat is formed. This is then pulled off and cut into small squares, which are then said to be boiled in water."

There appear to be two principal kinds of caoutchouc found on the banks of the Gambia—one of these is white and elastic. The tree yielding this is called in the Jolof language "tawl," and in the Mandingo dialect "choley," but on the Gold Coast "panwee." The description of the bark, wood and fruit appear to correspond closely with that of *Landolphia owariensis*. The other is called "maddah" (Jolof) or "cabbah" (Mandingo), and is considered to yield rubber of an inferior quality. The first named is locally valued at 1*s*. 4*d*. to 1*s*. 6*d*. per lb. and the second at 1*s*.

In the Gambia the rubber is collected as follows:—

"The bark is sliced or incised on one side of the tree, deep enough for the juice to start out in drops, and salt water, diluted with fresh water, is sprinkled from a bottle or calabash, which causes the juice to coagulate rapidly. Inland, where sea water is not procurable, a solution of one part of salt in three of water is used. Some of the milk is then dabbed on the forearm, and as soon as dry it is peeled off to form a nucleus. This is then applied to the fresh cuts one after another, and being turned with a rotary motion, the rubber is cleanly wound off from the cuts like silk from a cocoon, the semi-coagulated milk being thus drawn out of the bark around the incision. During this process a break is said to be of rare occurrence. The average amount thus obtained is about two and a half pounds per day, although as much as five pounds has been collected. These trees, or rather climbing shrubs, appear to be less injured by the process of tapping than the large trees of South and Central America, for Sir John Kirk states that he has seen hundreds of trees in full life so thickly scarred with cuts that nearly two-thirds of the bark must have been stripped from the tree. They will also endure a considerable drought and flourish in a light sandy soil. The rubber is not always, however, so pure as it should be, and hence merchants on the Gold Coast have recently purchased the milk at 9*d*. a quart obtained from species which yield it in a more fluid state in order to boil it down and dry it. Rubber so prepared realized last year 2*s*. 11*d*. per lb. As much as 12 cwt. of rubber has been prepared in this way in a week with the aid of one assistant."

Copal.—Only a small specimen of this resin is exhibited. It forms, however, one of the more important articles of export from Sierra Leone, the value of the exports of copal in 1882 being estimated at £11,262. It is supposed to be the produce of *Copaifera Guibourtiana*, and is valued at 1*s*. per lb., or when cleaned at 1*s*. 10*d*.

Another resin under the name of Gum Santang is exhibited from the Gambia. It is used medicinally by the natives and as a disinfectant, but is sold only in small quantities in the Mandingo and Jolof countries. The tree is, however, abundant on the banks of the Gambia river, and the resin appears worthy of being experimented upon.

Ginger.—The specimens of ginger exhibited are inferior in appearance, but the article is probably capable of improvement in quality by careful manipulation. The exports to Great Britain and the United States in 1882 amounted to £7917.

A small collection of drugs from Sierra Leone, sent by Mr. Sibthorpe, includes the following:—Egbessye root, obtained from the African peach, *Sarcocephalus esculentus*, and used throughout the west and south of Africa as a bitter tonic for indigestion, just as gentian is used in this country. Finger root, an aromatic stimulant, probably obtained from *Uvaria chamæ*, and apparently widely used on the west coast of Africa. Cashew gum, *Anacardium occidentale*, which affords an adhesive but somewhat gelatinous mucilage; cashew and mangrove barks used in tanning; and a kind of grass, called sumach grass, used for dyeing straw, etc., yellow.

Cola Nuts.—These are exhibited both in the form of seed and young fruit by the last named and other firms. According to Captain Moloney this nut is not grown in Gambia, but is mostly imported from Sierra Leone, the value of the exports from the latter country having been £33,108 in 1883. It also forms a regular article of export to Brazil from Lagos and Loanda. In the Portuguese possessions in Africa these nuts are said to be eaten in the morning with a small piece of ginger, but in the Mombuttoo country, according to Schweinfurth, they are chewed in the intervals of smoking. On the Gold Coast the tree is known as bisé, and according to Captain Moloney's Report several varieties are recognized by the natives. Thus besides the red and white cola nuts there are "*bisé bio*," the spurious kola nut, and "*sua bisé*," the

white-nosed monkey's cola nut; the latter is abundant and an oil is extracted from it; these varieties, however, unfortunately are not exhibited. The chewstick of West Africa is made from the roots of the true cola, *C. acuminata*. In the Mandingo language the cola is called "coorooah," and in that of the Jolof country "gooroo."

Several drugs are also exhibited by the Compagnie du Senegal at Sierra Leone, amongst which may be noticed "maluka" seed (*Polygala oleifera*), apparently used as a source of a fixed oil; black seed, which has kindly been identified by Mr. J. R. Jackson, of Kew, as that of *Hyptis spicigera*, but the use of which we have not been able to learn; Calabar beans of good quality; three varieties of castor oil seed of different sizes; Eguse seed; beeswax, and chilies. Castor oil seeds and the oil expressed from them, liquid honey and beeswax, both crude and purified, are also exhibited from the Gambia.

The export of chilies from Sierra Leone in 1883 was valued at £1291, and of Calabar beans at £759. The latter were also exported from the Gold Coast in 1881 to the extent of £125. Other articles of interest from the Gambia are native honey, the fruits of *Detarium senegalense* and of *Xylopia æthiopica*, native indigo in the form of balls formed of the crushed plant (*Lonchocarpus cyaneus* ?), the gum of *Khaya senegalensis* or native mahogany tree, and the seeds of *Cassia occidentalis*. The last named, although roasted and used like coffee in some parts of tropical Africa are used in the Gambia only in their natural state as a purgative medicine.

The fruits of *Xylopia æthiopica* are used by the natives as pepper, and are known as "country spice; in medicine they are employed as a stimulant for the mucous menbrane. In France, preparation of this fruit have been used for some years as a substitute for cubebs in gonorrhœa, leucorrhœa, etc., and have the advantage over that drug of a more agreeable taste. The fruits of *Detarium senegalense* are eaten by the natives, but it appears that two varieties exist, one of which is very bitter and is believed by the negroes to be poisonous. As with bitter almonds, however, there is no means of distinguishing the two except by taste.

Kino.—In the Sierra Leone exhibit, a specimen of the old original kino, obtained from *Pterocarpus erinaceus*, is shown. This is said not to gelatinize when made into tincture like the kino obtained from *P. Marsupium*. It is of a brighter colour, having the tint and transparency of garnets. It appears to be known to the Portuguese as *Sangue del Draco* but is not a regular article of commerce. There can be but little doubt, however, that if it were restored to the Pharmacopœia it would soon come again into commerce.

(*To be continued.*)

THE PREPARATION OF DATURINE.*

BY J. D. AUG. HARTZ.

I proceeded to manufacture this alkaloid by collecting sufficient stramonium capsules in the month of October, 1879, to yield 121 pounds of seed after the same had been dried in a garret for about one week. The dry seed was comminuted in a small mill to a coarse powder which was packed into a percolator in from 11 to 16-pound lots, permeated with petroleum benzine, and left to macerate for twenty-four hours, and then percolated with the same menstruum until apparently deprived of all fatty oil. The exhausted seed was spread out on paper to allow the benzine to evaporate, and was afterwards well dried under a stove, ground again in a mill, and passed through a No. 30 sieve. The remaining coarse powder was again subjected to benzine extraction, and once more ground and sifted, the remaining portion being reserved to be mixed with a new lot of seed to pass through the same procedure.

By thus repeatedly drying and extracting the seed—and probably by the further air drying of the whole seed, which was kept in a bag in a warm room during the continuance of the operation, which was from about December 1, 1879, until March 1, 1880, the weight of the oil-deprived powder amounted to only 86¾ pounds.

Portions of 12 pounds of this powder were moistened with 60 per cent. alcohol, packed into a 4-gallon Squibb's percolator, macerated for forty-eight hours, and then percolated with the same menstruum, the first 4 gallons having passed being subjected to distillation in order to regain alcohol. The distillate reduced to 60 per cent. was used to continue the percolation.

The percolates were separately received in 2-gallon bottles, and marked respectively 1st, 2nd, 3rd, 4th, and 5th percolate; the 3rd and following ones being used in numerical order, to moisten and percolate a new 12-pound lot of powdered seed.

In the still remained a dark green liquid mixed with a greenish coagulated albumen, which was emptied into a porcelain evaporating dish and allowed to cool completely. It was then strained through a closely woven linen cloth, and the collected albumen pressed, first with the hand and finally in a press. The expressed liquid, which was at this time tolerably clear, was evaporated as rapidly as possible over a water-bath to the consistency of syrup; the capsule containing the same, after cooling was placed in snow, and with continued stirring a mixture of 3 fluid ounces liq. sodii caust. of 1·22 specific gravity and 3 fluid ounces of water was gradually added, these being the quantities used for the extract obtained from 12 pounds of powdered seed.

On addition of the caustic soda, an ammoniacal odour was perceived, which at first was attributed to a decomposing action of the soda upon the alkaloid, but from later experiments the inference was drawn that in this dilution, and under the protecting influence of a low temperature, caustic soda does not have an immediate decomposing action upon daturine. The greenish colour of the extract changes to a yellowish hue, which also disappears. After this the mass thickens considerably by means of separation of alkaloid.

This mixture, in portions of about 4 ounces, was put into a 2-gallon bottle containing about 1 gallon coal tar benzine (containing at least 90 per cent. pure benzole), and vigorously shaken after each addition. After all the extract had been added, the shaking was continued for about ten minutes more and then allowed to settle. After separation, the benzole was poured off into another 2-gallon bottle, and a mixture of 90 grains pure sulphuric acid and 3 fluid ounces of water added, this being shaken with the benzole for ten minutes. The watery liquid soon subsided, when as much of the benzole as possible was returned into the bottle containing the extract, while the remainder was emptied into a large funnel, the orifice of which was kept closed with the index finger. After the separation of the two liquids, the watery solution of the sulphate of daturine was allowed to pass through a small funnel into a pint flask by separating the tip of the finger from the funnel orifice. When all the watery liquid had escaped, the orifice was closed again by pressure of the finger, and finger and small funnel were drained with about ½ a fluid ounce of water, and the remaining benzole was added to the extract. The latter was then agitated again for

* A paper read at the sixth annual meeting of the New York State Pharmaceutical Association. From the *Druggists' Circular*, August, 1884.

five or ten minutes and set aside to settle, and the benzole separated for use with the next lot of extract.

To the solution of sulphate of daturine was then added, drop by drop, as much of the liq. sodii caust. 1·22 specific gravity as was needed to precipitate all daturine; after this had been accomplished, 8 fluid ounces of benzole were added, and the flask corked and agitated. If this did not cause all of the daturine to dissolve in the benzole, the flask was dipped into water of about 120° F. (48·8° C.), agitating slightly at the same time—if after three or four minutes more considerable of the alkaloid remained undissolved, 4 fluid ounces more of benzole were added, and the whole agitated again. In almost all cases this proved a sufficient quantity of solvent.

As much of the benzole solution of daturine as could be poured off was filtered directly into a porcelain capsule. The watery liquid was separated from the remainder through an instrument made out of the neck of a broken retort into the narrow end of which a perforated cork with a glass tube drawn into a point, passing through it, was fitted. For inexperienced operators it is advisable to evaporate this watery liquid, as in one instance I found in the residue a considerable quantity of sulphate of daturine mixed with crystals of sulphate of sodium. This sulphate of daturine had remained undecomposed in the mother liquid, because I had hesitated to add sufficient caustic soda, it being particularly in concentrated solutions difficult to determine when all the alkaloid is precipitated.

In separating the liquids in the previously described instrument, the benzole solution of alkaloid passes last and is run directly into the filter which serves for the decanted benzole solution. Should, however, drops of watery liquid be suspended in it, it would be better to allow these to separate in a small beaker.

Twelve hours' standing is sufficient to crystallize out of the benzol nearly all of the daturine contained in the same. In this connection I would caution against accidents from the great inflammability of benzole.

The resulting crystalline cake was cut up with a horn spatula, the pieces pressed gently with the same, and the outflowing liquid added to the benzole, which was reserved for the future extraction of daturine. The crystalline cakes are spread on ten or twelve thicknesses of white filtering paper, and then covered with six or eight thicknesses of the same, gently pressed, the permeated papers being replaced by new ones as often as necessary.

The yield from 121 pounds of stramonium seed, or 86¾ pounds of powdered stramonium seed, deprived of oil and moisture, consisted of 1415 grains of daturine, or 0·167 per cent. of the dried seed and of 0·233 per cent. of the powdered seed deprived of oil and moisture.

According to Trommsdorf, the yield of alkaloid in the most favourable case is one-fiftieth per cent.: with a yield of eight to twelve times this quantity the excellence of the above described method seems indisputable.

The sample of daturine which is in the exhibit of this meeting was recrystallized from redistilled benzole. The proportion of the solution was one to fifteen. According to the intensity of the yellowish tinge which the daturine had assumed, from one-fifth to one-fifteenth of its weight of blood, coal was employed for decolorizing.

I desire to state that I obtained some hints of the *modus operandi* with coal tar benzine for the extraction of alkaloids from the August, 1875, number of the *Druggists' Circular*.

PHARMACY IN BRAZIL.*

The *Pharmaceutische Rundschau* states that in Brazil an examination is required to practise pharmacy, but there are no regulations as to the number of pharmacies. In the capital city—which has a population of about 500,000 inhabitants, there are 185 pharmacists, one to every 2700, but the number is continually increasing. Socially the position of the pharmacist is similar to that which he holds in the United States, though perhaps not so high, as in the larger cities, Rio Janeiro included, many of the pharmacists are merely "tradesmen," who handle almost exclusively patent and proprietary articles, which it is said the physicians prescribe in the majority of cases. It has only been within the last few years that the Brazil druggists have made preparations of their own, and this is done to a very limited extent only, most of the medicines being imported from England, France and the United States. Chemicals are obtained from Europe principally, there being no chemical factories and few good laboratories. There is no national pharmacopœia, and although the Government prescribes that the French Codex shall be used, the pharmacists, in general, work according to whatever formulary suits their convenience. In the pharmaceutical, chemical and medical schools, French books are used, with the exception of a work on botany and one on chemistry, organic and inorganic, which are written by professors in the college at Rio Janeiro. Two medical papers are published and appear to be successful, but the local pharmaceutical journal, for want of support, has been discontinued. Notwithstanding this apparent absence of a scientific business of pharmacy, the Brazil laws are strict in regard to certificates to practise—at least as far as red tape is concerned. Pharmacists must pass the examinations and submit the particulars of their business plans, together with diplomas, to the Central Board of Health, which sends two physicians and two pharmacists to see that the establishment is properly furnished with drugs and preparations. A violation of these regulations will make the party subject to a fine of 100 to 200 milreis (somewhat over 50 to 100 dollars) and close his business. A repetition of the offence is punished by a confiscation of all the stock. Foreign physicians, who can show that they have held the position of professor at some recognized university, or are authors of a known scientific work, can get permission to practise without passing examinations. The students in the pharmacy schools are examined in French, Portuguese, arithmetic and geometry. Then follow three years of studies, divided into series as follows:—(1) Physics, inorganic chemistry and mineralogy; (2) organic chemistry, botany and zoology; (3) pharmacology, toxicology and practical pharmacy. An examination has to be passed at the end of each series, and this is divided into practical, written and *viva voce* sections. Foreign pharmacists, with the diploma of a recognized pharmaceutical school, properly attested, can be admitted to examination *sine curriculo*. The fees come to about 240 milreis (about 125 dollars). In case of failure, no part of the fee is refunded. The student who goes straight from school to the university course gets but little practical teaching, and although the graduate receives a diploma stating that he is competent to conduct a pharmacy, he finds himself obliged to seek a position as assistant, without pay, if he would learn to make any of his own preparations. The regular assistants, the majority of whom are Portuguese, are paid from 25 to 60 dollars per month. There are some Italian and a few French assistants, but all are required to speak Portuguese.

There is little difficulty, provided the regulations are observed, in starting a business there, as everything may be bought on credit. In Rio Janeiro there are two French pharmacies. One has one assistant, an Italian; the other two, both Portuguese. There are three German, two Italian and three Portuguese pharmacies, but none described as English or American. All the other proprietors are Brazilians.

Medical schools are at Rio and at Bahia, and there is a pharmaceutical school at Auro Preto, the capital of the province of Minas, but its diploma is only good for that province. The Rio school has an average of 550 to 600 medical, and about 525 pharmaceutical students, and turns out annually about 80 doctors of medicine, and 25 to 30 pharmacists.

* From the *Weekly Drug News*, June 28, 1884.

The Pharmaceutical Journal.

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CINCHONA CULTIVATION AND ALKALOID MANUFACTURE IN BENGAL.

THE twenty-second annual report for the year 1883-84, on the Government Cinchona Plantations in British Sikkim, which has just been received, contains some interesting information respecting the result of the efforts that have been made in the plantations of the Bengal Presidency to eliminate inferior kinds of cinchona and cultivate the more valuable ones, and especially the promising hybrids, with more discretion. It also gives further details as to the development of the experimental attempt to establish a manufacture of a cheap febrifuge that shall to some extent take the place of the more costly quinine in the treatment of malaria. The total crop derived from the three plantations of Runjung, Mungpoo and Sittong during the year is stated to have amounted to 305,160 pounds of dry bark, of which by far the greater proportion, 283,240 pounds, was red bark. The remainder was made up of calisaya bark, 14,320 pounds, hybrid bark, 3490 pounds, and officinalis, 2190 pounds. The crop was partly taken from young trees that had been "thinned out" and partly from more or less mature trees that had been uprooted for the sake of their bark. As only a few pounds of this bark was sent into the market there are no data for estimating its commercial value; though an estimate is given, based on the division of the total year's expenditure on the plantations by the number of pounds gathered, which places its cost at annas 3 pies 5·61 per pound. But as such a method ignores interest upon capital invested, besides being affected by temporary conditions that may limit or increase the cropping in any particular year, it is evident the sum mentioned is little more than an arbitrary one, and may possibly be only quoted to be used as a basis for an estimate of the cost of febrifuge manufactured.

With the exception of the small quantity sold, and one hundred pounds supplied to the Calcutta Medical Depôt, the whole of the year's crop of bark was made over to the febrifuge manufactory. The total quantity of febrifuge manufactured during the year was 8714 pounds. Of this 250 pounds consisted of what is described as a new crystalline preparation, closely resembling the ordinary febrifuge, in superficial appearance, but the grains upon closer examination proving to be small crystals. It is claimed that in its constitution this crystalline product differs materially from the old febrifuge "as it contains none of the amorphous alkaloid which is the ingredient in the old febrifuge which causes the nausea that sometimes follows its administration." The relative proportion of the quantity of febrifuge produced to that of the bark used in its manufacture is stated as 2·728 per cent., a figure that might at first sight appear suggestive that the bark was poor in alkaloid. But in the light of recent experience as to the extent to which bark can be exhausted by means of dilute hydrochloric acid, which is presumably the menstruum used in this case, the result would appear as favourable as could be expected in operating upon bark even of fair quality by so wasteful a process. The estimated average cost of the febrifuge manufactured during the year is rather under ten and a half rupees per pound, this being put down as being in excess of the cost of the previous year. But it appears to us that the estimate is vitiated by the manner of valuation of the raw material to which reference has already been made. The distribution of febrifuge during the past year amounted to 9144 pounds, being in excess of the quantity distributed in the previous year as well as of that manufactured during the current year. Of this quantity 4850 pounds have been used in Government institutions, for which they appear to have been debited with a sum of 80,045 rupees, or at the rate of a little more than a rupee an ounce. This result is one that is worthy of congratulation, and we do not think the case is at all strengthened by the suggestion that the use of this large quantity of mixed febrifuge has saved the purchase of an equal quantity of quinine at three times its cost. The obvious retort to such a statement is that the "febrifuge" is not quinine and has not the same market value, a fact concerning which, if Dr. KING really has any doubts, they will probably be dispelled by the importation of English-made febrifuge referred to in the report as being imminent.

In the direction of the improvement of the plants the principal operations appear to have consisted in the uprootal of nearly a quarter of a million of red bark trees and the planting of yellow bark trees in their place. These latter were partly Ledgerianas from plantation seed and partly "verde" or "morada" plants raised from seed from South America, which had been supplied by the Secretary of State for India, at whose initiative this radical alteration has been made. The "verde" and "morada" seeds are described as having germinated freely, but a considerable number of the seedlings died when scarcely half an inch high and many more succumbed during the severe winter; those that survived, however, are said to be healthy and promise to be good quinine yielders. There appear to be now at least ten hybrids recognized

some of them yielding bark of high quality; particular attention is being paid to these, and steps are taken for the isolation of the Ledgerianas to prevent injurious cross-fertilization by insects. Another point worthy of remark is that attempts have been made to raise from seed plants of the genus *Remijia*, from which the celebrated cuprea bark is derived, but these have hitherto been unsuccessful.

PHARMACY IN THE FRENCH NAVY.

We have more than once remarked in these columns upon the relatively slight importance which is attached to pharmacy in the military and naval services of this country, so far as this is indicated by the arrangements for the preparation and dispensing of medicines and the rank accorded to persons entrusted with those duties for the soldiers and sailors of our country. From time to time we have quoted from various sources information as to the regulations controlling similar duties in other countries, but naturally as a rule it has been the military service which has been referred to. As a suitable complement, therefore, to previous notices, we take the opportunity of quoting some particulars as to the organization of the pharmaceutical service in the French navy which have just been published in the *Pharmaceutische Zeitung*.

The subject was dealt with legislatively so recently as the year 1882, in a law for the reorganization of the naval staff and the official corps of the French marine, under which the pharmacists were included in the Sanitary Corps. The regular members of the French corps of naval pharmacists are eighty-seven in number and they are ranged in six grades as follows: one inspector of pharmacy, five naval superior staff pharmacists, eight staff pharmacists, twenty first class naval pharmacists, twenty-eight second class naval pharmacists, and twenty-five naval pharmacist pupils. The staff is recruited from the "pupils," who are nominated on the results of competitive examinations that are held annually, and from "auxiliary apothecaries of the second class" who, after successfully passing an examination, are promoted to be "naval pharmacists of the second class." The conditions with which the candidates have to comply in order to be allowed to take part in the competitive examination and the subjects in which they are to be examined are laid down in a special ministerial order. The conditions under which promotion takes place and the relative rank which each grade is to hold in the navy are also definitely specified. Beginning with the lowest grade it may be stated that the "pupils" rank as cadets and are not allowed to take part in the competitive examination until they have been three years in the Naval Sanitary Corps. Recourse is had to the "auxiliary naval pharmacists" for recruits to the regular body only when required in the interests of the service, and naval pharmacists drawn from this source are employed preferably in the colonies, whilst the class is also the subject of a special decree as to its rank and privileges. The naval pharmacist of the second class ranks with a naval ensign. Before becoming eligible for further promotion he must have belonged to this grade at least three years, a definite portion of which must have been spent in the colonies, and upon becoming a candidate for an appointment in the first class he must produce a first class pharmacist's diploma from some university. Upon entering the first class he takes rank as a first lieutenant, and before he can be further promoted he must be at least four years in active service, definite portions of which time must, in order to count, be spent on board ship and in the colonies. The promotion to the post of naval staff pharmacist depends partly upon selection and partly upon length of service, and entails a rank equal to that of a captain of a frigate. Upon the occurrence of a vacancy in one of the professorial chairs held among the staff pharmacists, the appointment must be given to one who has no other professorial duties to perform, and the officer appointed must produce evidence of having passed the professor's examination as defined by a ministerial decree. The next advance, to the position of a superior staff pharmacist, who ranks with a full naval captain, is made solely by selection, but the field of choice is limited to those who have held the post of staff pharmacist at least three years. If the vacancy occurs in the place of a superior staff pharmacist who has been engaged in educational duties it must be filled by the appointment of a staff pharmacist who has been similarly engaged; and only the appointments unassociated with tutorial work are open to those who have not previously held professorial posts. Lastly, the highest appointment, that of inspector, is made by selection from superior staff pharmacists who have served in that capacity at least three years. The inspector of naval pharmacists, like the director of the naval medical department, ranks as a rear-admiral.

It will be evident that, if the foregoing is a fair representation of facts, the official corps of pharmacists in the French navy constitute an important and highly ranked organization, for which there is no counterpart in this country. The nearest approach that has been made to it in Great Britain is the small body, sixteen in number, of dispensers in Her Majesty's naval hospitals at home and abroad. These, it will be remembered, are divided into two classes, dispensers in charge of stores, who must possess the Major qualification, and ordinary dispensers in naval hospitals, for which post the Minor qualification is sufficient. The English naval dispensers, however, do not, like their French brethren, now rank as naval officers, but are officers in the civil service under the control of the Medical Department of the Navy.

A new College of Pharmacy was opened on the 9th of June in Melbourne, under the joint auspices of the Victoria Board of Pharmacy and the Pharmaceutical Society of Australasia, the inaugural ceremony being attended by the Colonial Premier (Mr. Service), the Attorney-General and other notabilities. The college is located in Swanston Street, in a building that had been used as a county court, but which on the completion of the new law courts was specially granted by the Government for the purpose, and has since undergone the alterations necessary to provide a suitable lecture hall, laboratory, library and other conveniences. After the ceremony the company, numbering about fifty, dined together in the library, Mr. Blackett, the President of the Pharmaceutical Society, occupying the chair. The toast of "Success to the College of Pharmacy" was proposed by Dr. Neild and acknowledged by Mr. Bosisto, who referred with gratitude to the liberality with which the Government had assisted the project. The "Health of the Chairman" was proposed by the Premier, who expressed the gratification with which he had observed the title "Pharmaceutical Society of Australasia," because it had a federal significance and pointed to the grand future there was in store for the young colonies. In his reply, Mr. Blackett said that it was true that the Society was labouring to the utmost to secure uniform pharmaceutical legislation throughout the Australasian colonies, and though New Zealand had held out for a time, she was now herself submitting a proposal for a pharmaceutical conference. After referring to the advantage accruing to the general community by the establishment of such an institution as the College of Pharmacy, he expressed a hope that the next step would be its affiliation to the University of Melbourne.

* * *

We have received a communication from the Secretary to the Chemists and Druggists' Trade Association in which he refers to the frequent inquiries received by him as to whether the use of labels containing the word "patent" involves a liability to payment of the medicine stamp duty. Mr. Haydon very correctly points out that by the provisions of the 105th section of the Patents, Designs and Trade Marks Act any person selling an article bearing the word "patent" for which no letters patent under the seal of the Patent Office have been granted renders himself liable for each offence to a penalty not exceeding £5. The use of the word "registered" in conjunction with any trade-mark or design that has not been registered is similarly prohibited.

* * *

We learn from the *Canadian Pharmaceutical Journal* that the evidence laid before the grand jury in the gelsemium poisoning case (see before, p. 71) showed that in the drug store from which the fatal supply was obtained gelsemium and rue were kept in the same drawer, which bore two labels. The apprentice appears to have looked upon "gelsemium" and "rue" as different names of the same article and to have been unaware of the fact that either one drug or the other was dangerous. The grand jury returned a true bill against the apprentice for manslaughter, but made a special presentment urging the necessity for legislation "requiring that all packages containing poisons should be kept apart from other drugs and be not allowed to be dispensed or sold except by qualified persons." The trial of the case was postponed.

We learn from the New York *Weekly Drug News*, that recently five persons in a Philadelphia boarding house, being endowed with those "idle hands" for which occupation is sure to be found, answered to the challenge of one of their number and helped themselves to a number of pills out of a bottle lying on the mantelpiece, where it would appear to have been left by a previous boarder. The pills, probably, contained strychnia and the joke terminated in the death of one of the party and the serious illness of the other four. The inquest has been adjourned to allow of an analysis of the pills, with a view of fixing the responsibility upon the druggist who dispensed them.

* * *

The *Pharmaceutische Zeitung* quotes from an Austrian writer some particulars of a visit to the rhubarb growing district in the northern slopes of the Kuku-Nov mountains. The soil is described as consisting of layers of rich earth washed down from the higher regions and the growth of the rhubarb plant as extending from the bottom of the valley up to the limits of the forests, an elevation of about 3200 metres, and sometimes higher. Not only the Tangutians, but Chinese, from Lining-fu, are here occupied in the industry, the springtime and autumn being considered the most favourable times of the year for digging up the root, on the ground that the root juices are then more powerful. The plant frequently reaches a height of three metres or more and consists of a stem three or four centimetres thick, at the base of which are three to ten dark green cordate, divided leaves. Above, the stem bears several branches, attaining half a metre in length and bearing groups of small white flowers. In this district the rhubarb plant flowers in July, the seed ripens in August, and in September it is collected at the same time as the root by the Tangutians, who also cultivate the plants in the neighbourhood of their tents. The rootstock consists of a longish tuber, to which are joined numerous long slender adventitious roots. These latter are cut off in the collection as useless; but the principal stock is dried in the sun and then transported to Lining-fu, the principal market of the drug. On the spot the root is very cheap, enough being obtainable for a few copper coins to last a family a lifetime, but the transport from Lining-fu to Pekin increases its cost twentyfold.

* * *

According to some "Colonial Notes" published in *Nature*, the cultivation of hops in New Zealand has received this year a sudden expansion. In Nelson, the cultivation has been most successful, and around Wellington the plant also grows well.

* * *

It appears from a note in the *Lancet* that poppy cultivation has been considerably on the increase in the province of Rajputana, in India, in consequence of the extension of irrigation works there and of the opening of the Rajputana-Malwa Railway, by which the produce is rendered more easy of access to Bombay.

* * *

The *American Druggist* says that the manufacture of perfumery in Florida, from flowers grown in the state, has been commenced and bids fair to become an extensive industry. It is reported that a process has been elaborated for the utilization of the mangrove and sapodilla, and also to extract the fragrance from the cassava plant.

British Pharmaceutical Conference.

TWENTY-FIRST ANNUAL MEETING.

(*Continued from p.* 200.)

The following paper was read by Mr Benger—

The Pungent Principles of Plants.

BY DR. THRESH.

The object of this paper is to place on record the results of investigations upon which I have been engaged from time to time for the last three years. Unfortunately the difficulties attending the isolation of these pungent principles have been so great that the value of the results bears no relation to that of the labour expended. This fact, together with the knowledge that for some time to come my time for investigations of this character will be very limited, has led me to publish the results in their present unfinished form. I had hoped to have carried the research further before Conference, but an unfortunate fire at my laboratory destroyed the whole of a comparatively large quantity of an active principle which had cost no end of trouble to isolate and purify.

By a "pungent" principle here is referred to, a class of bodies destitute of odour, possessing a purely burning taste, and neither bitter, nauseous nor acrid. The best known drugs containing such principles are cayenne pods, the rhizomes of ginger and galangal, the peppers, and grains of paradise. Prior to my isolation of capsaicin nothing whatever was known as to the nature of the constituents upon which the pungency depended. Bucholz had indeed examined the fruit of a capsicum, and obtained a red oily fluid of intense pungency, which he named capsicol, but its very properties showed that it was not a pure proximate principle.

In plants these pungent matters invariably occur associated with resins, and generally also with fats and volatile oils. But whilst in cayenne there is an abundance of fat and little resin or volatile oil, in ginger and pepper there is an abundance of resinous matter and volatile oil, and very little fat. In galangal the fat predominates; in grain of paradise the resins. As yet the active principle of cayenne pepper is the only one obtained in a crystalline condition, the viscid straw-coloured fluids obtained from the other drugs closely resembling, however, capsaicin after having been melted. (After melting, it will be remembered, it remains frequently for a considerable time in the semi-fluid condition.) All attempts to prepare gingerol and paradol in crystals have failed, the process by which crystalline capsaicin is procured not being applicable in isolating any other of the active principles; but it is especially worthy of remark that when capsaicin is isolated by any process in which treatment with lead acetate, etc., is resorted to, it is obtained in the fluid state and obstinately resists all efforts to make it crystallize. It is possible that gingerol, paradol, and the other pungent principles are crystallizable substances which, from presence of some trace of impurity, are prevented from crystallizing. This impurity very probably is a terpene polymer (*vide Pharm. Journ.*, 3rd series, xii., 721), but if so, an excessively minute trace must be sufficient for the purpose.

In the plants examined the pungent matters are all found to possess the following characters in common :—

Ready solubility in 50 per cent. alcohol, ether, chloroform, benzol, carbon disulphide, turpentine, acetic acid, and dilute solutions of potash.

Slight solubility in cold petroleum ether.

Insolubility in solutions of ammonia and of alkaline carbonates.

Ready destructibility when treated with oxidizing agents. With moderately strong nitric acid, much carbonic acid is evolved, and oxalic and succinic acids are formed, a complex mixture of resins, and one or more acids of the fatty series. Oxidized with alkaline permanganate oxalic acid is formed in abundance, the only other product (in cases examined gingerol and paradol) being a caproic acid, $C_6H_{12}O_6$. Warmed with acid permanganate CO_2 is evolved with brisk efflorescence. Warmed with chromic acid mixture two-thirds of the carbon is given off as CO_2 and fatty acids, and the remainder as a volatile neutral substance which resists further treatment with the oxidizing agent.

All have a density only slightly exceeding that of water. Gingerol and paradol, when carefully heated, begin to decompose at a temperature a little over 100 deg. C., becoming darker in colour and evolving an inflammable gas, and from 2–3 per cent. of a colourless, limpid liquid distils. The temperature rises rapidly to about 182° C., when about 5 per cent. of a yellowish less limpid distillate is collected. The temperature then goes on increasing until too high for the mercurial thermometer to register, when about 40 per cent. of a thick, reddish-coloured oil condenses. The residue in the retort is solid when cold, of empyreumatic odour, and pitchy appearance.

Combustions have been made of capsaicin, gingerol, and paradol. The ultimate analysis of the former showed that its empirical formula was most probably $C_9H_{14}O_2$ (*Pharm. Journ.*, 3rd series, vii., 473). Though vastly less pugent, paradol appears to have the same empirical formula. Three separate quantities of paradol (*a*), (*b*), and (*c*) were obtained by the following processes, and as on their combustion concordant results were obtained, there is little possibility of error.

(*a.*) A tincture of the seeds made with 50 per cent. alcohol was precipitated with basic lead acetate, and the filtrate evaporated to remove the spirit. The semi-fluid matter which separated after removing the lead and the spirit was well washed with cold petroleum ether, then repeatedly boiled with the same solvent, and the matter which was deposited on cooling used for the combustion.

(*b.*) Some finely powdered seed was exhausted with petroleum ether, most of the latter distilled off and the deposit dissolved in spirit and precipitated with lead acetate and ammonia. In the filtrate the lead was removed by H_2S, and then carefully evaporated and the paradol removed by agitation with chloroform.

(*c.*) An ethereal tincture of the seed was mixed with excess of petroleum ether, and the crude paradol which separated was dissolved in dilute alcohol precipitated with lead acetate and shaken with petroleum ether. (To remove resin salt soluble in petroleum ether.) The alcoholic liquid was then treated with H_2S, etc., as in (*b*), to obtain the pure active principle.

Each specimen was well dried over H_2SO_4 *in vacuo* before combustion. Sample (*b*) was a shade darker than either (*a*) or (*c*).

	Paradol used.	CO_2 formed.	H_2O formed.
(*a.*)	·4584	1·1785	·3785
(*b.*)	·3180	·8172	·2642
(*c.*)	·4033	1·0342	·3306

From which we calculate—

	C.	H.
(*a.*)	70·11	9·18
(*b.*)	70·06	9·25
(*c.*)	69·94	9·11
Mean—	70·04	9·18
$C_9H_{14}O_2$ requires	70·13	9·09

The substances were burnt with copper oxide in a current of oxygen. There is but little doubt, therefore, that paradol is isomeric with capsaicin, the analytical results being almost identical. Apart from their different physical properties they do not yield the same products on oxidation with chromic acid mixture. The fatty acid obtained by oxidation of the very small quantity of capsaicin which I possessed appeared to be valerianic from its odour and per cent. of silver yielded by ignition of its silver salt. Paradol under similar circumstances yields a mixture of fatty acids, apparently a caproic and a heptylic acid with a little formic acid. The silver salt obtained by adding silver nitrate to the solution of

the sodium salts of the sudorific smelling oily acids gave as a mean of two determinations 47·21 per cent. silver.

Silver salt.	Silver yielded.	Per cent. silver.
·3666	·1729	47·16
·2804	·1325	47·26

By fractional precipitation a silver salt was obtained which gave on analysis 48·84 per cent. Ag, and another yielding 45·59 per cent. Ag.

·2130	·0971	45·59
·0432	·0211	48·84

$C_6H_{11}O_2Ag$ contains 48·43 per cent. Ag.
$C_7H_{13}O_2$ Ag ,, 45·57 ,,

Besides these acids a neutral limpid fluid is obtained which is insoluble in water and dilute alkalies, slightly soluble in S. V. R., the latter solution not being coloured by ferric chloride or reduced by silver nitrate and ammonia, nor apparently affected by further digestion with the oxidizing solution. It was in the hope of being able to prepare a sufficient quantity of this fluid for a more extended examination that I had made the quantity of pure paradol which has previously been referred to as having been destroyed by fire.

2·148 grams paradol yielded, on oxidation, 2·201 grams CO_2 = ·600 gram C, and fatty acid estimated to contain ·432 gram C. As the above quantity of paradol would contain 1·506 gram C, we have ·475 gram (or about one-third) to be accounted for. The neutral limpid oil as yet unexamined no doubt represents this.

Gingerol appears to differ but little physically from paradol. If anything it is more soluble in petroleum ether than the latter, and reduces silver salts more readily. Upon oxidation with chromic acid mixture it yields apparently acetic and caproic acids, and a volatile oil probably identical with that from paradol. It is more easily affected by heat, decomposition perceptibly commencing when heated to a little over 100° C. This property, and the fact that in the ginger rhizome it occurs associated with from three to five times its weight of resins, etc., which it is exceedingly difficult to remove, causes its preparation to be an exceedingly tedious process. A number of combustions of gingerol, obtained by different methods, have been made, but only by operating in the following way can a product be obtained yielding constant results. The ethereal extract of ginger is treated with proof spirit, the tincture thus obtained precipitated with basic lead acetate and filtered. The lead is removed by H_2S, and the clear liquid distilled under diminished pressure until the alcohol is removed, and the aqueous fluid poured off the crude gingerol which has been deposited. This is dissolved in a little ether and several volumes of petroleum ether added, the precipitated gingerol (still impure) is redissolved in spirit, basic lead acetate added and the lead in the filtrate removed as before. After distilling off the spirit, etc., the active principle is once more dissolved in ether, and petroleum ether added until considerable turbidity is produced. After standing the clear supernatant fluid is decanted and distilled. The gingerol thus obtained is perceptibly paler in colour than that precipitated by the addition of the petroleum.

The following combustions were made with gingerol thus obtained :—

	Gingerol burnt.	CO_2 formed.	H_2O.
(1)	·3875	1·0125	·3352
(2)	·3625	·9490	·3203

The percentage composition is therefore,

	(1)	(2)	xC_5H_8O requires.
C	71·27	71·39	71·43
H	9·61	9·82	9·52
O	19·12	18·89	19·05

The mean of three concordant combustions of the portion precipitated by the last treatment with petroleum ether gave

C 72·09
H 9·49

Resin β, the one most difficult to remove, has previously been shown (*Pharm. Journ.*, [3], xii., 721) to contain 73·27 per cent. C and 8·55 per cent. H, hence it is probable that a small quantity of this is contained in this impure principle.

·784 gram oxidized yielded ·696 gram CO_2 = ·189 C, and fatty acids calculated to obtain ·144 gram C, leaving rather more than one third for the neutral oil at same time formed. A larger quantity was oxidized, and the distillate, after being neutralized with normal NaHO solution, was concentrated and standard acid added to liberate half the acids. The globules of oil were taken up by petroleum ether, and required 13 c.c. soda solution to neutralize. All the reactions of this solution pointed to the fatty acid being normal capoate. Upon determining the metal in the silver salt,—

·2515 gram yielded ·1219 gram silver or 48·52 per cent. (Ag $C_6H_{11}O_2$ requires 48·43 per cent.)

The liquid from which this acid had been removed was treated with more acid and re-distilled. The solution gave all the reactions of dilute acetic acid. The barium salt was obtained, and the barium estimated as sulphate.

1·0110 gram of the salt yielded ·9340 gram $BaSO_4$ or 92·38 per cent. Pure Ba 2 $C_2H_3O_2$ would yield 91·38 per cent. The too high result obtained was afterwards satisfactorily accounted for.

Paradol like gingerol and the other pungent principle examined forms compounds with the heavy metals, most of which are insoluble in water but soluble in dilute alcohol. They are amorphous, viscid, reddish substances, which however obtained form a sticky resinous layer on the sides and bottom of the containing vessel. So far as examined no reliable information was obtained as to their composition, which seemed most variable. In chloroformic solution paradol, gingerol, etc., combine with bromine, but as the fluid becomes of a dark brown colour it is difficult to tell when sufficient Br has been added. Towards the end of the reaction HBr begins to be evolved, and on evaporation of the chloroformic solution decomposition takes place.

3·065 grams paradol combined with 4·5 grams bromine. Probably therefore a compound having formula

$C_{18}H_{28}Br_6O_4$

is formed. This formula requires

Br.		Paradol.
155·8	to	100
Found.		
146·8	to	100

Treated with strong alcoholic or aqueous solution of potash, or with fused potash, a reddish-brown hard soap results, insoluble in strong alkaline or saline solutions. No protocatechuic acid (or allied bodies) is formed, in fact the resinous acid of the soap appears to be the sole product left in the solution or fusion.

Upon dissolving the soap in water, decomposing, with acid, etc., a soft resinous mass separates, which was redissolved in a small quantity of alkali and reprecipitated with CO_2.

The soft odourless and tasteless resin thus obtained was dried, and a portion burnt with following results :—

·3154 gram substance gave ·2474 gram H_2O and ·8553 gram CO_2.

Possibly the formula of this body is $C_{17}H_{24}O_3$.

	Theory.	Found.
C	73·91	73 97
H	8·69	8·72

This differs from the formula which possibly represents paradol, $C_{18}H_{28}O_4$, by the elements of methyl alcohol, CH_4O.

Paradol can be dissolved in cold strong sulphuric acid to a blood red solution which if poured into much cold water produces a mere turbidity. If warmed, however, brown oily drops immediately separate.

The pungent principle of the fruits of *Piper nigrum* I have not satisfactorily isolated, but very probably it is allied to gingerol and the other pungent principles just considered. An ethereal extract of black pepper was freed as far as possible from ethereal oil and piperin, and

the resinous residue was readily soluble in spirit and possessed considerable pungency. When warmed with chromic acid mixture it was rapidly oxidized with evolution of CO_2, and formation of two or more acids of the fatty series. A small quantity of an oily acid was obtained which reacted as the caproic acid from gingerol, but the odour was unmistakably that of ordinary valerianic acid. The amount obtained was too small to admit of further experiments.

The active pungent principle of the galangal rhizome I have only been able to obtain in very small quantity, and probably only in a state of proximate purity. Upon oxidation, however, it yielded much CO_2, together with acetic and another fatty acid. Unlike gingerol and paradol it did not yield also a limpid neutral oil, but a small quantity of crystalline matter was found in the distillate, which melted at about 140° F., and was not soluble in dilute alkaline solutions. The higher fatty acid had decidedly an odour recalling that of the sixth and seventh members of the fatty series, and when converted into the potassium salt it gave with silver nitrate a very voluminous white precipitate, soluble in boiling water. The barium and calcium salts were also soluble in hot water, and deposited in minute crystals on cooling. $CuSO_4$ also gave a very voluminous pale blue precipitate soluble in boiling water. Fe_2Cl_6 gave a bulky pale red precipitate.

·193 gram silver salt yielded ·084 gram Ag, or 43·5 per cent. It is probable, therefore, that the acid is one of those with formula $HC_8H_{15}O_2$, the silver salts of which contain 43·03 per cent of silver.

There is no doubt but that this principle, which for the present may be called "Alpinol," belongs to the same group of bodies as paradol and gingerol.

The PRESIDENT moved a vote of thanks to Dr. Thresh for his admirable paper. He had chosen one of the most difficult branches of research, and the Conference had to thank him very much for the valuable results he had obtained.

Mr. NAYLOR desired to express his personal gratitude to Dr. Thresh for his paper, having worked on similiar bodies himself, and having been compelled to put them on one side, simply because he had never been able to obtain them in a sufficiently definite condition. Dr. Thresh had now shown how they might prosecute investigations in this direction, which was a marked addition to their knowledge.

Mr. HOLMES said there was one point in connection with this very valuable research which struck him as worth asking a question upon. It was an extremely interesting fact that these pungent principles should be compounds with the fatty acids, but he did not gather that Dr. Thresh gave any intimation of opinion as to whether they were united with an alcohol or some other body of a similar nature. He hoped that Dr. Thresh would be able to add information on this point in future.

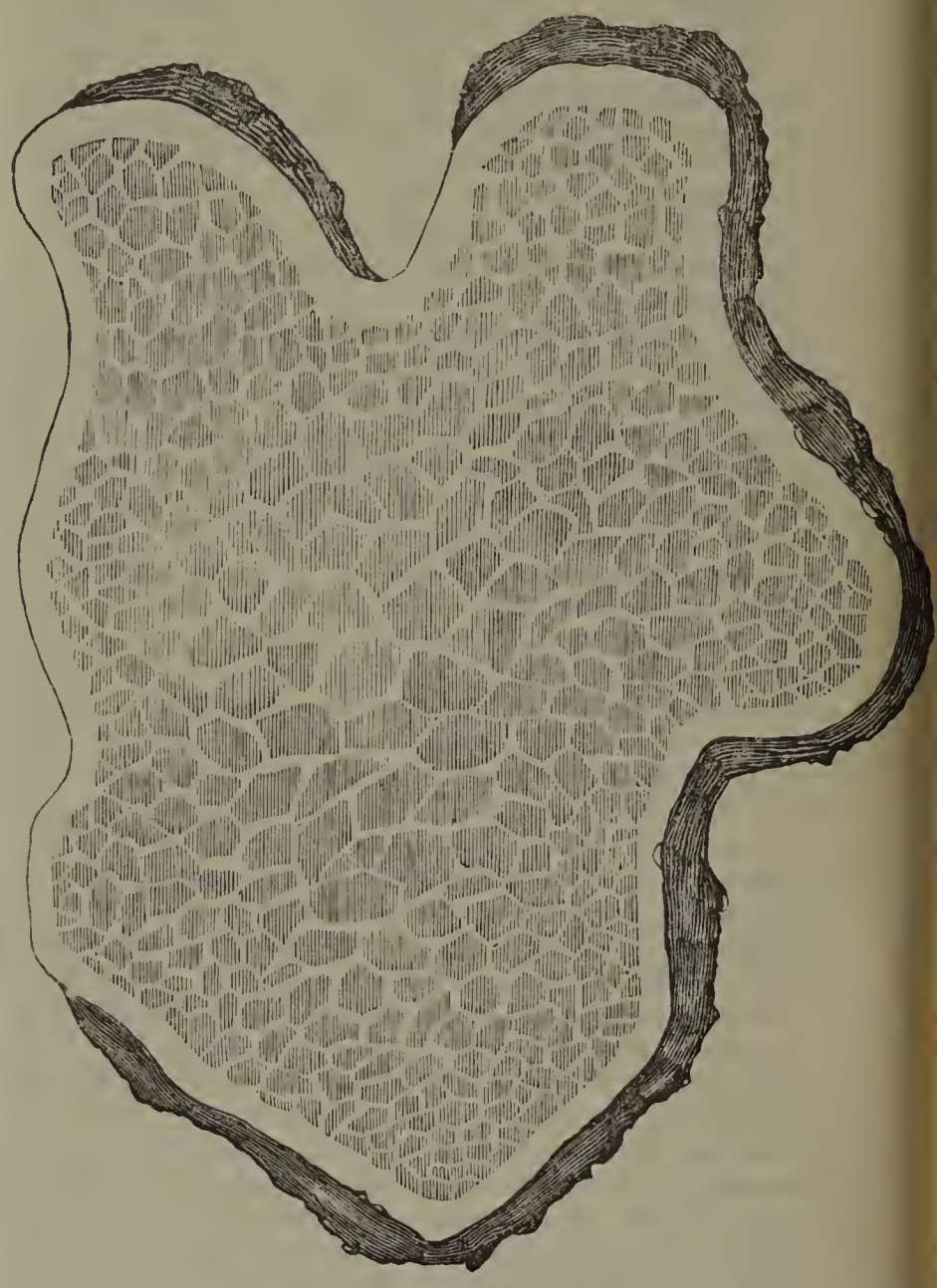
The following paper was then read—

NOTE ON A SPECIMEN OF MYLITTA AUSTRALIS, FORWARDED TO THE CONFERENCE BY MR. A. P. MILLER, OF HOBART, TASMANIA.

BY WILLIAM SOUTHALL, F.L.S.

As it seemed desirable that some little detailed information should be given of the interesting specimen sent to the Conference by Mr. Miller, the Honorary General Secretaries were good enough to entrust me with the duty. I fear that the compilation of information I have been able to gather will not be very complete.

The plant is catalogued in Hooker's 'Botany of the Voyage of the *Beagle*,' where it is described under the name *Mylitta Australis*, Berkeley, as having an indurated peridium or outer covering whilst the interior of the compact mass is dry, sub-horny, containing heterogeneous veins. Recent specimens of this Australian plant, which is used as an article of food, exhibit something like asci. There can be but little doubt that the plant is autonomous,



Transverse section of young plant of *Mylitta Australis*.

meaning that it has an independent existence, it having been suggested by some observers that it was of the nature of a gall, or even the root of some phænogam.

The accompanying figure, of a transverse section, is founded upon that in Corda's 'Icones Fungi,' but the hexagonal character of the pits is not preserved. In the same volume is a description by Tulasne of its general characteristics, in which he says that "it is the native bread of the English Colonies of Tasmania." Mr. Berkeley, to whom we owe much of the collected information respecting it, had not succeeded any more than other observers at that period in discovering the spores or any apparatus for fructification. We would rather suppose that it is a kind of mycelium. Mr. Berkeley considers to be an ally of the true truffles. Before drying, the solid and fleshy mass presents a multitude of regular pits, generally hexagonal—large and filled with a semi-transparent pulp of a watery-white, having something the appearance of melted wax, and is soft enough to spread under the spatula. The walls of the pits are formed by a substance pure white, opaque and somewhat corky, which does not divide readily or regularly anyway. The same parenchyma is extended to within about 3 or 4 millimetres of the periphery of the fungus, and is further covered by a thin black bark of a crustaceous character, unequally thick and deprived of warts or regular eminences, and which detaches in plates on specimens dried before their perfect development. The pits situated immediately beneath the corky layers are mostly smaller than those of the centre. Observed under a microscope the two constituent substances of the fungus appear to be both formed of long twisted filaments thickly set and branched; those in the waxy matter, destined to harden without losing transparency,

are finer than the others. Some of the specimens are regularly rounded and very heavy, the black bark being rugous and adherent; others are extremely misshapen, and seeming shaken with age are much lighter." Our specimen belongs to the former category, weighing, I understand, thirty-nine pounds. It is only in fresh specimens that some of the particulars mentioned by Tulasne may be observed. Specimens like this are like the cheese in Tartary that requires an axe to cut it, and upon this even an axe makes very little impression.

The late James Backhouse, of York, in his missionary journeys in Africa and Australia, made many botanical observations, and amongst other plants he alludes to this. He mentions that a species of tuber is often found in Van Diemen's Land attaining to the size of a child's head. It is known by the name of Native Bread, and in taste somewhat resembles boiled rice. Like the heart of the tree fern and the roots of the native potato (an orchidaceous plant), cooking produces but little change in its character. He says that he often asked the aborigines how they found the tubers, and he always received the same answer—"a rotten tree." He also mentions—which has a bearing upon its autonomy—that on dry open hills it is to be detected by the ground bursting upwards with something underneath, which is this fungus.

In other countries scattered over the earth are various plants more or less allied. Thus Tuckahoe or Indian bread is found in Carolina and other parts of the United States similarly in large masses. There is an article respecting it in the *Gardeners' Chronicle*, 1848, by Mr. Berkeley, in which it is mentioned that Dr. Macbride, who had examined and described it ('Linnean Society Transactions,' vol. xii.), contested strongly its fungoid character. Analysed by Professor Ellet, of South Carolina University, it had been found to consist of nearly pure pectin; but whatever it may have proved to be botanically, Mr. Berkeley concludes by saying that Tuckahoe is totally different from the native bread of Van Dieman's land, which is clearly very closely allied to the common truffle.

Mr. Berkeley again returns to the subject; his paper is in the *Linnean Society's Journal*, vol. iii., 1858. Here he deals with two Chinese productions, of which he determines one to be nearly allied to *Mylitta australis* and the other identical with *Pachyma Coniferarum*—Tuckahoe or Indian bread. The latter of these, as pointed out by Mr. Hanbury, who at the request of Mr. Berkeley had obtained information respecting their uses in China, is called Foo-ling, and is largely made use of, converted into cakes, which are considered to be both nutritious and medicinal; indeed, Professor Ellet had previously pointed out that Tuckahoe was an antidote for some of the more active mineral poisons. The cakes are sold to the cry "A Hoo Ka Foo-ling Ka" in the streets of Shanghai. The name "foo" or "fuh" is derived from fir tree, and the very finest specimens are called "fuh-shin," one of which, as big as a man's fist, if you hang it as an amulet round your neck, is so powerful that it will discomfit a hundred devils. Choo-ling is a somewhat different production, and similarly it is nearly pure pectin; it is sold in the same way, but the name is not savoury as it refers to pig's dung. but the Chinese are not particular. Unfortunately, Mr. Berkeley says but little light is thrown upon the real nature of these productions by all the information we possess. No fungus has ever been found on the American or Chinese tubers, and he comes to a similar conclusion with regard to the specimen above mentioned, allied to the native bread of Australia. "The internal substance is marbled like a truffle, but there is not a trace of fruit, and in consequence, together with Mylitta, it must be considered of very doubtful affinity."

I had hoped to submit the results of further examination, but reasons with which the Honorary Secretaries are acquainted have prevented me doing more chemically than to repeat Professor Ellet's experiment affirmatively as to pectin. I have also observed microscopically that the crowded hyphæ have some tendency in places to form concentric rings, but I could discover no asci. The plant may be considered to be the mycelium or the sclerotioid-mycelium of a fungus of which the other stages of growth have never yet been observed.

In the Museum of the Pharmaceutical Society is a specimen of another species, from Canada if I mistake not, *Mylitta lapidescens*, the tubers of which are from the size of a walnut to that of a nut, equally hard and nearly black.

The PRESIDENT, in proposing a vote of thanks to Mr. Southall, said this specimen had been presented by Mr. Miller, of Hobart Town, Tasmania, who had been recently appointed Local Secretary in that part of the world, and it was therefore one of the first fruits of their new colonial policy.

Mr. HOLMES said the *Mylitta lapidescens* to which Mr. Southall referred came from Jamaica, and there had been an article in the *Gardeners' Chronicle* on it lately. With respect to the *Mylitta australis*, he hoped their colonial friends would try and investigate the perfect state of this fungus, for there could be very little doubt it was a fungus in a very imperfect state. It had been one of the puzzles of fungologists for a great number of years, and it would be a great boon to them if they could obtain the life history of the plant.

Mr. ATKINS asked if this article were used as food at all, or was it regarded purely from the fungus point of view for its flavour, or any other domestic culinary purpose. He should also like to know whether there were any superficial indications of its growth. One of the most interesting of the English fungi was the truffle, which showed no external indication, and in his own neighbourhood a particular breed of dog was kept for the purpose of finding it. The other day a gentleman who had been travelling in Japan told him there was a singular form of truffle found there, much larger than our own, which was also hunted for by a particular species of dog. That fungus he said was very prejudicial to health until it had been boiled, when it became a valuable element of food.

Mr. PLOWMAN said no account of any satisfactory investigation had been received from their colonial friends, but only an explanatory letter. As to its being cooked, it was stated in the paper that cooking produced but little change in its character and if that were the case, it was hardly likely the natives would take the trouble to cook it. Mr. Miller said in his letter, "I can say little about the native bread except that the aborigines of Tasmania were very fond of it and considered it a delicacy. There is neither leaf, branch, root or stem shown above ground to indicate where it can be dug for successfully, but after rains the natives used to discover the spots by cracks of a peculiar nature in the surface which indicated its locality."

Professor Redwood then took the chair whilst the President read the following paper:—

NOTE ON CERTAIN ANHYDROUS ESSENTIAL OILS.

BY JOHN WILLIAMS.

A few months back I had occasion to prepare some samples of a few essential oils in an anhydrous, and if possible colourless, condition. The specimens were required for certain optical experiments to which it is not necessary that I should further allude on the present occasion. Some of the results obtained in preparing them, however, appear to be sufficiently curious and interesting, from a pharmaceutical point of view, to justify me in bringing the subject before the Conference and submitting samples of the products obtained for inspection.

The oils operated upon were the essential oils of

orange, lemon, bergamot, origanum, geranium, lavender and peppermint.

These samples were obtained from a most respectable and reliable source as of good commercial quality, and I have no doubt could be taken as fairly average samples of the best oi's usually found in commerce. I assume also that they were quite free from anything in the shape of adulteration.

Under ordinary circumstances essential oils are distilled with the aid of water or in a current of steam, but as my object was to obtain "anhydrous" oils, it was evident that such a process could not be adopted. On the other hand, when essential oils are distilled over a naked gas flame or other similar sources of heat, there is great risk, indeed almost a certainty, of over heating, and the product consequently becoming contaminated with empyreumatic matter.

This difficulty was got over in a very simple manner by adopting a mode of procedure somewhat largely employed in our laboratory, with a slight modification for which I am indebted to my friend Mr. Miles Smith. The details you will perhaps permit me to occupy a few minutes in describing.

The process consists in employing a bath of fusible metal, and thus avoiding the possibility of the oil becoming overheated at any point.

The fusible alloy employed is composed of bismuth, cadimum, tin and lead. It melts at 140° F., or far below the boiling point of water. It is true it is a rather expensive material when compared with ordinary solder, which is generally used for this purpose, but it presents the great advantage that there is little or no danger of the retort cracking when it is plunged into the melted bath, whereas with solder this danger is considerable.

The source of heat made use of is a Fletcher's or Bunsen's gas burner. The fusible alloy is contained in an iron basin into which the retort can be lowered or raised at will. No Liebig's condenser is required or advisable, for so high is the temperature at which these essential oils boil, ranging from 160° to 240° C. (320° F., 464° F.), and so easily condensible and so litle dispersive are their vapours, that no water is required for their condensation. In fact the end of the retort simply requires to be inserted for an inch or two inside a somewhat larger tube two or three feet in length; and with a flask at the end to act as receiver, the apparatus is complete. No cork or luting is required; simply a little soft paper wrapped round the joint will be found sufficient to keep in the vapour of the oil.

When an essential oil of the kind I have been experimenting upon is heated in the manner described, there first comes over a mixture of aqueous vapour and oil. This oil that first comes over boils at a comparatively low temperature, and although it is of a pleasant flavour it can be easily distinguished from the true oil. It, however, does not occur in large quantity in any oil I have examined; the utmost I think would be from ½ oz. to 1 oz. from a pound of natural oil.

After a time the neck of the retort is seen to clear from streaks and striæ, and the boiling point of the oil rises somewhat. It is then necessary to change the receiver, when a considerable quantity of the anhydrous oil distils over, generally amounting to quite one half, frequently more, of the oil operated upon. In fact as a rule this portion is by far the largest fraction. I should mention that the boiling point is at no time constant or steady, but is continually, although slowly, rising throughout the distillation. After a time the temperature is observed to rise more rapidly, when the receiver has to be again changed, as a quantity (comparatively small, it is true) of high boiling and coloured oil now passes over, the boiling point rising in many cases to 240° C., or upwards; on one occasion nearly 300° C. was reached, but that was not with one of the oils I am now directing your attention to.

It is not advisable to continue to apply heat beyond the point at which the high boiling oil comes over very slowly and in small quantity; for if that be done, white smoke-like clouds form in the retort, denoting that the point of destructive distillation has been reached. But if the process be stopped before that point is arrived at a residue is left in the retort consisting of very curious and interesting resinous or oleoresinous bodies, probably the products of oxidation of the natural oils. I wish to draw your attention to these bodies; possibly they have not been produced before in a state in which they could be examined, as by the ordinary mode of manipulation they would either be left behind in the water or be so changed by direct heat that their real nature could not be distinguished. The quantity of resinous matter produced varies very much with different oils, but as a rule it is much greater than I anticipated.

The anhydrous essential oils, to produce which was the main object I had in view, as obtained in the way described were slightly coloured, or became so after being kept a few days. To obtain them in a colourless condition it was found necessary to redistil them a second time, when with the exception of the geranium oil, which still came over slightly coloured, the whole were obtained in a perfectly colourless state. I may remark that upon the second redistillation of the anhydrous oils a little aqueous oil came over at first, proving that the oils obtained in the first redistillation were not quite anhydrous. A little resinous residue was also left in the retort, but the amount was very small in comparison to that remaining after the first redistillation.

The samples on the table will, I trust, prove of interest to members. They consist of some of the pure anhydrous oil, the high boiling oil, and the residual matter left behind in the retort. This residue I have no doubt was contained in its present state in the original oil, and is not a product of decomposition.

The oil of orange yielded a large quantity of pure anhydrous oil, but little of higher boiling point, and a brown oily residue, not so offensive as some of the others.

The lemon oil yielded a large quantity of anhydrous oil. The residue was dark brown, and solid, but not offensive in smell.

Bergamot yielded a large quantity of pure oil. The high boiling oil was coloured and not pleasant. The residue was very dark coloured, but liquid, and very offensive in smell.

Origanum yielded a large quantity of pure oil. The residual oil was very dark coloured, more liquid than the bergamot, but not so offensive in smell.

Geranium oil turned out very badly. The pure anhydrous oil was comparatively small in quantity, and still coloured; the high boiling oil was in small quantity and not nice. The residual oil amounted to quite one half the original oil; it was very dark coloured and very offensive.

The original oil of lavender was of American origin. The amount of pure anhydrous oil obtained was smaller than from some of the other oils. The high boiling oil was very much coloured and not of pleasant flavour. The residual matter was nearly black, of the consistence of treacle, and very offensive.

The oil of peppermint was also American It yielded about the same proportion of pure anhydrous oil as the oil of lavender. The high boiling oil was still distinctly peppermint, but coarse in flavour. The residual oil was light brown and thick; it was not so offensive as some of the other residues, but was very inferior to ordinary oil of peppermint in flavour.

With respect to the pure anhydrous oils there can be, I think, no doubt that a great improvement has taken place in their flavour. They will perhaps strike most persons as not being so strong as the original oils but that, I think is due to their having been deprived of the coarse —though probably powerful—smell of the high boiling oils and the residual matter. In fact when the residual oleoresins are examined I think it will be quite under-

stood how the flavour of the various oils must be improved by the removal of such crude and in many cases really offensive matter.

At present I do not know how long these anhydrous essential oils will keep,—that is, how long they will retain their superior qualities if they have a ay,—or in what time they will again become oxidized and converted back into the state of the original oils. This I intend to try, by keeping samples of these anhydrous oils, and observing, if possible, their rate of change. I have an idea that it is likely anhydrous oils will keep for almost an indefinite time, and that the oxidation and change of these bodies is due to the presence of small traces of water. It would be a very important thing if we could devise a mode of keeping essential oils in good condition for at any rate some time, and I shall watch the results of keeping these samples with interest. Should I obtain any results of sufficient importance, I shall have great pleasure in making a further communication upon the subject at some future time.

Professor REDWOOD proposed a vote of thanks to Mr. Williams for this very interesting and in some respects very important communication. It was very interesting to him, not so much on account of the facts brought forward as the prospects held out of the attainment of further results which might be looked for in connection with some of the essential oils.

Mr. DOTT suggested that it was just possible that the temperature employed might have caused some decomposition, and asked Mr. Williams if it was attempted to distil the oils *in vacuo* in order to avoid the possibility of decomposition.

Mr. SCHACHT said if he were not mistaken this subject was investigated to a considerable extent by Dr. Tilden some years ago, and he had an impression in his mind that Dr. Tilden then succeeded in working out an important point with reference to many of these essential oils, some of which were included in Mr. Williams's list, namely, that they were not simple bodies, but that the majority, if not all, contained a hydrocarbon pure, and also a compound oil containing oxygen; and moreover that these were to a considerable extent separable by distillation. He also believed that the opinion then expressed was that the odorous oils were chiefly those which contained oxygen, and it occurred to him as Mr. Williams was reading the paper that, valuable as many of the results were, one thing seemed to be wanting, namely, a reference to some definite moment at which the true essential oil was supposed to be coming over. One of the series was oil of lavender, and he understood the boiling point was low at the first part of the process and then gradually rose. Now, if it had been found that for any distinct period during the operation the temperature had been constant and the characters of the distillate for that period tolerably well marked, it might have been hoped that real oil of lavender was then coming over. That, however, did not appear to have been observed, and so the doubt remained as to whether the distillate were normal oil of lavender or some indefinite mixture of educts and products. As Mr. Williams thought the odour in some cases less strong in what he thought the best portion of his product, he would suggest whether it might not be possible, if the odorous principle belonged to the oxygen compound, that a change was taking place all the time, and that comparatively little of the odorous principle landed in what was termed the result, but that large portions were retained in the resinous and somewhat offensive product which was left in the retort.

Mr. PLOWMAN said Mr. Williams had shown a number of residues, but had alluded to them somewhat briefly. He should like to ask Mr. Williams if he had conducted any experiments to prove whether these substances were brought over mechanically with the steam during the first distillation of the oils; whether they were produced by oxidation by keeping, or whether they were produced, as Mr. Schacht seemed to suppose might be the case, by the second process of distillation at high temperatures. This opened out a wide field for inquiry, but it would be useful if Mr. Williams would only give some indication of his own opinion to which of those three processes the residue was due.

Mr. ELBORNE said it would be interesting to know the specific gravity of the distillate as compared with the original sample of oil taken. Essential oils were liable to great sophistication which it was almost impossible to detect, and he believed that nearly all commercial samples of essential oils contained certain added substances of the nature of turpentine which had been previously rendered entirely odourless.

Mr. WRENN said this paper appeared to confirm a considerable number of experiments in which he had himself engaged. He had lately redistilled the whole of the essential oils in an ordinary glass retort which was covered with asbestos. He had previously dried them with chloride of calcium: some made three separate distillations. He found the first always came over at a very low boiling point, and had a low specific gravity. The second one came over at a higher boiling point, and had a higher specific gravity, and so on to the end. It was not always the first distillate which had the best aroma, or was most similar to the primary product. He always found a terpene odour prevailed in the first, but there was the true odour, more especially in the second. The question had been asked, Did the colouring matter or the resinous matter arise from being carried over by the steam, or was it a product of oxidation? He had some samples which were perfectly colourless nine or ten months ago, and they remained so for four or five months, but they were gradually regaining colour. One had been submitted to redistillation two or three months ago, and this oil which previously appeared to be entirely free from any resinous matter was now exhibiting signs of resin gradually being formed. His opinion, therefore, was that it was due to oxidation, not altogether to the mechanical action of the steam. He would also ask how Mr. Williams arrived at the boiling point with which he had had some difficulty. He found an ordinary U-tube with mercury the best.

Professor REDWOOD said Mr. Schacht had called attention to the fact that some communications had been made on a former occasion on subjects allied to the one now brought forward. He regretted he could not recall the facts exactly, but his memory somewhat failed him in that respect, though he was quite conscious of the fact, and had had some little practical experience himself in attempting to produce some of these essential oils in a condition similar to that in which Mr. Williams had now obtained them and by a process very similar. He had been in the habit of using a fusible-metal-bath as an excellent means of ensuring a constant temperature considerably higher than boiling water, and had used this in the distillation of essential oils, more particularly oil of lemon. All who had had any experience of this oil must be aware that it was one the physical characters of which were liable to very great variation when kept for any length of time. In point of fact those who had to use it largely as a flavouring agent would very willingly indeed pay a large sum of money to anyone who would indicate the means by which oil of lemons could be made to retain its natural odour as when first obtained in the usual way from the lemon. The best natural oil of lemons was obtained not by distillation but by mechanical means, by which the oil vesicles were fractured and the oil pressed out from the lemon peel. Some portion was subsequently obtained by distillation with water, but that was not of the best description. Oil of lemon obtained by puncture had an extremely fragrant odour, which it was incapable of retaining for any length of time; exposed to the air it lost that flavour and acquired an odour somewhat allied to oil of turpentine, so much so that many persons supposed that this

essential oil had been adulterated with oil of turpentine where no such admixture had taken place; it was probably a molecular change which occurred. These essential oils consisted of a hydrocarbon and an oxidized oil, and the hydrocarbon had the same centesimal, but not the same molecular composition as oil of turpentine. It appeared to him that in any process, such as that Mr. Williams had adopted, what was obtained really was, as Mr. Schacht had suggested, a product and not an educt. He might be asked where was the proof of that, and there he must be content to submit to the criticism which Mr. Naylor might apply, for he confessed he had not chemical evidence, but nevertheless he had a certain amount of physical evidence. If he took a sample of oil of lemon, such as persons engaged in the flavouring of jellies attached a high value to, and if that oil were submitted to distillation two or three products were obtained. The original oil was not shown by Mr. Williams, but there was a distillate obtained at the lowest temperature, one obtained at the highest and a residue. The first thing he observed was that no one of them had the flavour of the original oil of lemon, nor did it approach it in fragrance and sweetness and in fact the residue was rather disagreeable in odour, and none of the others could be used as flavouring agents. His acquaintance with distilled oil of lemons commenced a great many years ago, and he remembered when a house in Bond Street used to sell an article for the removal of grease stains from ladies' dresses, which on being examined was found to consist of oil of lemons with alcohol and a little camphor. Now taking the oil in its original condition that would not answer the purpose, because there was resinous matter, and it would have left, when volatilization took place, a stain worse than the original one, and distilled oil had to be used. Now these products of distillation were none of them at all comparable with the original oil, nor from all of them together could what was started with be reproduced. The distilled oil was not equal to the original oil, and if what was left in the retort were added to it, instead of making it better, the residue made it much worse. He thought therefore it was quite obvious that there were chemical changes taking place in the process of distillation which materially affected the physical characters of the oil. The same thing applied to other essential oils, though he had worked more upon oil of lemons than others. Here was a subject for much further research, either by Mr. Williams himself or, if he were too much occupied, as he probably was, it was a fine subject for some young chemist to take up and show how the essential oils, especially such a one as oil of lemon, could be rendered permanent without being destroyed by a process of distillation. Such processes had been suggested, and he was not sure that Dr. Tilden himself did not communicate a method of dehydrating these essential oils without submitting them to distillation. It appeared from some experiments made that if oil of lemons were dehydrated by some such body as chloride of calcium it would be much more permanent, and would retain its flavour much longer than would otherwise be the case. He could not sit down without again expressing to Mr. Williams great indebtedness not only for this paper but for the address at the opening of the meeting, for which he thought he had been but very inadequately thanked.

Mr. Williams, in reply, said the object of his little note had been somewhat misunderstood. It was not a research and he did not call it a paper. He simply had a customer who wished him to produce a certain number of essential oils which would be anhydrous and colourless, and which were intended for certain optical experiments. Most of the work was done before he thought of bringing this note before the Conference, and it was only as a kind of after-thought it occurred to him that it might be interesting to show these results. That was why he could not give what Mr. Dott would like, the ranges of temperature. All they did was to keep a thermometer in the retort and notice that the temperature rose in accordance with what was stated in all chemical books respecting these oils, but he had not attempted to make any research on the nature of the oils, for which, in fact, he had not time. Professor Redwood had referred to the oil of lemons, which was a very interesting oil and perhaps the weakest example in his argument. When he produced oil of lavender and produced the residue which was left in the retort, if they believed the residue was contained in the original oil, which was a very good oil, was not that enough to account for the commercial oil not being so fine in flavour as they would like it to be? It was quite an open question, and, in fact, was what he wanted to ascertain, whether these residues were contained in the oils or were produced during distillation? The pure anhydrous oils had been twice redistilled. The residue had been separated during the first distillation. The second distillation only yielding traces—not in most instances sufficient for weighing. The high temperature necessary for distilling the oils might have acted upon some oxidized product in the original oil to produce the oleoresins exhibited, but the mere high temperature evidently did not produce such products from the pure oils alone. The distillation having been conducted under the circumstances he had mentioned would almost lead one to suppose that the residues were really contained in the original oils, but he could not say he was certain on that point. Of course he was aware of Dr. Tilden's researches, and it must not be supposed that he in any way attempted to supplement that work. It was perfectly certain the oils were not homogeneous, and the fact of the thermometer rising continuously and there being no fixed boiling point was sufficient to demonstrate that. His real reason for bringing these samples was on account of these residues, which, he thought, had probably not been seen before, for they were generally thrown away and destroyed. He quite agreed with Professor Redwood's remark that mixing the three together would not produce the original essential oil of lemons, but something very different, and, therefore, a change had occurred. He originally thought he would bring the light oil which came over first, and also a sample of the original oils, but for a note of this sort he thought it was hardly worth while. He only wished to show what he might call purified anhydrous oil, that which came over last, which was found very peculiar in the smell, and the residue which was frequently very offensive. He had not taken the specific gravities. With regard to drying with chloride of calcium, he might say they had tried distilling with quicklime, but did not get the result they wanted, namely, anhydrous colourless oils. They found also that quicklime did not give such a satisfactory result as distilling the oils by themselves. Oil of orange was one of the first tried and they distilled that with lime, but he considered the product was certainly more offensive than when distilled by itself.

The Conference then adjourned for luncheon.

The chair was again taken by the President at half-past twelve, when the following paper was read by Mr. Benger:—

Tincture of Quinine.

BY R. WRIGHT,
Pharmaceutical Chemist.

The above preparation is a very important one, seeing that it offers to the medical practitioner a concentrated solution of the alkaloid quinine in a neutral condition, the latter a by no means unimportant desideratum in some diseases.

The question has often arisen and been discussed, as to whether it is the best solution of the kind which it is possible to obtain, and especially as to whether a tincture of greater uniformity of strength cannot be prepared.

The object of the present paper is to discuss this question, to investigate the causes of the variation in strength

of commercial samples of tincture of quinine, to give the results of the analysis of a number of samples of the tincture ordinarily sold by retail chemists and druggists, and to suggest means whereby the great desideratum of uniformity of strength may be secured.

The process whereby tincture of quinine is prepared differs from that of every other tincture, except tinctura ferri acetatis and tinctura quiniæ ammoniata, in that it is not a merely physical process of solution or extraction, but one which involves chemical decomposition as well.

Every pharmacist who prepares his own tincture of quinine is aware of the fact that when the sulphate of quinine comes into contact with the calcium salts derived from the orange peel, a double decomposition takes place, part of the sulphuric radical combining with the calcium, and, *pari passu*, an organic salt of quinine probably going into solution.

That this is so was first pointed out by Mr. Groves, in the discussion on a paper on "Tincture of Orange," read by the late Mr. Haselden, at an evening meeting of the Pharmaceutical Society (*Pharm. Journ.*, vol., iii., 361).

The opinion then advanced by Mr. Groves has since been confirmed by many observers, who have proved conclusively that the precipitate produced in the preparation of the pharmacopœial tincture of quinine consists solely of calcium sulphate, free from both tannin and alkaloid.

An approximate estimation of the amount of calcium salts present in orange peel was made from carefully dried samples of peel.

As the opinion had been expressed more than once by correspondents in the *Pharmaceutical Journal* that the lime salts existed mainly or entirely in the inner portion of the peel, this was carefully separated from the outer portion, and each estimated separately.

In each case two estimations were made, and the percentages subjoined indicate the mean of the two concordant results.

	Percentage amount of ash.	Soluble in water.	Insoluble in water.
Inner	4·8	2·5	2·3
Outer	6·5	3·25	3·25

These results show that the outer portion of the peel is the richer in calcium salts, corresponding with my experience, which is that the best tincture of orange (*i.e.*, the tincture made exclusively from the outer portion) yields also the best tincture of quinine.

The portion of ash insoluble in water dissolved with effervescence in dilute hydrochloric acid, indicating that the calcium exists in the peel in combination with an organic acid.

The next point which it was sought to settle was the solubility of sulphate of quinine in proof spirit. The latter was made by diluting rectified spirit of wine with distilled water until, at a temperature of 60° F., it had a specific gravity of ·920.

Two series of solutions were first made, one from a commercial sulphate of quinine labelled B.P., the other from that manufactured by Messrs. Howard and Sons, Stratford.

The solutions in each series contained respectively, 7, 6½, 6, 5½ and 5 grains of sulphate of quinine in 1 fluid ounce of proof spirit, and were made by digesting the mixtures contained in well-corked bottles, in water at about 150° F. shaking occasionally till a clear solution was obtained. They were then set aside in a cupboard where the temperature remained moderately constant at about 60° F. It was then remarked that the solutions in each series which contained 7, 6½ and 6 grains showed signs of crystallization, those containing 5 and 5½ grains remaining clear. This seemed to fix the degree of solubility between the limits of 5½ and 6 grains in the ounce. For the more exact determination of the solubility the following method was adopted.

An excess of sulphate of quinine was allowed to digest in proof spirit for several days, at a temperature of about 60° F., the mixture being occasionally shaken.

A fluid ounce of the saturated solution was taken. To this 10 drops of dilute sulphuric acid was added, and the mixture evaporated over a water-bath to drive off spirit. The aqueous solution was then allowed to cool. When cold 20 drops of liquor ammoniæ, B.P., was added, and the mixture shaken up with two successive portions of ether. The two ethereal solutions were mixed, evaporated to dryness in a tared dish, the residue weighed, and the amount of quinine sulphate calculated from the equation:—

$$(C_{20}H_{24}N_2O_2)_2, 2\,H_2O = (C_{20}H_{24}N_2O_2)_2,\ H_2SO_4.8\,H_2O.$$

Four estimations were made, two with each sample of the sulphate above mentioned, and the results came out almost exactly concordant, the mean solubility being 5·7 grains sulphate of quinine in one ounce of proof spirit.

The question now arose as to whether the limit of solubility was ever approached in tincture of quinine.

This was solved by calculating from the amount of calcium sulphate obtained in making tincture of quinine. The first calculation is based upon results obtained by myself, the second on those placed on record by Mr. Butt (*Pharmaceutical Journal*, [3], vol. ix, 910).

I. From 4 pints tincture of quinine, 23 grains anhydrous sulphate of calcium was obtained.

Supposing $CaSO_4 = (C_{20}H_{24}N_2O_2)_2.H_2SO_4.8\,H_2O$, or 136 grains calcium sulphate=890 grains quinine sulphate.

Then 28 grains sulphate of calcium represents 183 grains sulphate of quinine, leaving, of undecomposed sulphate of quinine 457 grains or 5·7 grains in each ounce of the tincture.

II. From 16 pints and 8 ounces tincture of quinine, Mr. Butt obtained 90 grains calcium sulphate. This represents 588 grains quinine sulphate, and leaves 2036 grains undecomposed, corresponding to 6·3 grains in each ounce. Thus, we see that although, at the normal temperature, the solubility of sulphate of quinine in proof spirit is only 5·7 grains in an ounce; in tincture of quinine we have a variable quantity of undecomposed sulphate, the amount, in the cases cited above being in one instance 5·7, and in the other 6·3 grains in the ounce.

What are we to infer from this? Obviously, that unless an abnormal proportion of organic calcium salt be present in the tincture of orange employed (and hence in the orange peel from which this was prepared), the quantity of undecomposed sulphate of quinine present in the resulting tincture of quinine will be so great that in cold weather a portion of it will inevitably crystallize out. This fact was brought very strikingly before my notice the other day, when, on examining the four pints of tincture upon which the above-mentioned calculation is based, and which, after being made, was placed in a cold cellar where the temperature of late has frequently ranged as low as 40° F., I noticed that some light, feathery crystals of sulphate of quinine had already separated. Yet this had been very carefully prepared, and from a tincture of orange made by myself, proof spirit of full strength being employed.

From the above consideration it appears certain that however carefully tincture of quinine is prepared, it is quite a matter of chance as to whether or not the quinine will all remain in solution.

It was next attempted to solve the question as to what is the organic acid which exists in orange peel in combination with calcium. Many unsuccessful attempts were made before a process was devised by which the acid could be isolated. The great difficulty lies in the fact that it is almost impossible to separate the calcium salt from the glucose and tannic and mucilaginous matters with which it is associated in the peel.

The following process, however, was found to answer well:—The peel was reduced to coarse powder, and exhausted by maceration and percolation with a methylated spirit of proof strength. The spirit was

recovered by distillation. To the dark coloured aqueous extract thus obtained plumbic acetate was added till tannic and astringent matters were removed. To the clear filtrate, absolute alcohol was added very cautiously, till a slight turbidity was produced. On setting the mixture aside for a few hours, a copious precipitate settled. This was collected on a filter, washed with spirit, then dissolved in water to which a little acetic acid had been added; and the solution precipitated by basic acetate of lead. The precipitate was filtered off, well washed with spirit; and afterwards mixed with water. It was then decomposed by passing sulphuretted hydrogen through the mixture. This was filtered, and the resulting almost colourless acid liquid evaporated to a low bulk over a water-bath, and finally over a dish of sulphuric acid under a bell-jar to dryness; when the acid was obtained in small crystals. These were found to possess the characters and answer to the tests of citric acid, and there is no doubt in my own mind that the organic acid which exists in combination with calcium in orange peel is citric. Probably it exists there as an acid citrate.

The examination of a number of trade samples of the tinctures of orange and quinine was next undertaken; the results of which are shown in the following table.

The object in view in regard to tincture of orange was to ascertain whether trade specimens contained the full proportion of spirit, a question which has an important bearing upon the stability or otherwise of a tincture of quinine made from it.

In estimating the amount of quinine sulphate in the tincture, the process employed was the one previously mentioned; the results also were calculated from the data there given. In the case of Nos. 7–38, a sample of each tincture was procured from the same house, and in the case of the first six, which were made by myself from different samples of peel, the tincture of quinine was prepared from the tincture of orange opposite which it is found in the table.

It will be noticed that the percentage amount of alkaloid in some of the tinctures comes out rather high. This arises from the difficulty experienced in obtaining the hydrous quinine free from the colouring matter of the tincture of orange. The results generally may, however, be taken as approximately correct:—

The table is printed in the following column.

The main deductions to be drawn from the table are:—

1. That when carefully prepared the specific gravity of tincture of orange will be from ·930 to ·934, and should not be higher than ·940. It will be seen that three-fourths of the samples examined fall within the limits indicated.

2. That whereas tincture of orange is always more or less acid, tincture of quinine if free from added acid will always be neutral to test paper.

3. That the specific gravity of tincture of quinine prepared from a tincture of orange of full alcoholic strength will be about ·934, and should not be higher than ·945.

4. That notwithstanding the fact that by the process at present official it is impossible to obtain a stable and uniform tincture of quinine; nevertheless, in the great majority of cases the alkaloidal strength approximates very nearly to the pharmacopœial standard, viz., 8 grs. sulphate of quinine in a fluid ounce.

The practical question remains—how are we to obtain a tincture of quinine which shall fulfil the conditions laid down at starting as regards neutrality, degree of concentration and uniformity in alkaloidal content?

Three substances have been tried, viz., freshly precipitated quinine, the so-called neutral or "soluble" sulphate, and the hydrochlorate.

With regard to the first of these, the process is difficultly workable, and the fact that the quinine separates out on diluting such a tincture with water is a fatal bar to the adoption of the process.

With regard to the neutral sulphate, the same objectionable precipitate of calcium sulphate forms, as is the case with the official sulphate.

The hydrochlorate, however, answers admirably, and fulfils all the requisite conditions. It is easily soluble in tincture of orange, no precipitation takes place, and the solution remains stable.

The suggestion that in the next edition of the National Pharmacopœia this salt should be made official for the preparation of tincture of quinine is not an original one. It was first suggested by Mr. Whitfield (*Pharm. Journ.*, viii., 440), and again by Mr. Martindale (*Pharm. Journ.*, ix., 407). The experiments made by myself enable me fully to support their recommendations.

Table showing Specific Gravity, etc., of samples of Tincture of Orange and Tincture of Quinine.

	Tincture of Orange.		Tincture of Quinine.			
No.	Reaction.	Specific Gravity.	Reaction.	Specific Gravity.	Hydrous Quinine. Grains per oz.	Quinine Sulphate. Grains per oz.
1	Acid	·930	Neutral	·934	6·2	8·1
2	Acid	·930	Neutral	·934	6·1	7·9
3	Acid	·930	Neutral	·934	6·4	8·3
4	Faintly acid	·934	Neutral	·938	6·0	7·8
5	Acid	·930	Neutral	·934	6·0	7·8
6	Acid	·934	Neutral	938	6·5	8·4
7	Acid	·958	Neutral	·942	6·5	8·4
8	Faintly acid	·922	Acid	·934	6·5	8·4
9	Faintly acid	·922	Neutral	·926	6·2	8·0
10	Acid	·930	Acid	·934	6·0	7·8
11	Acid	·942	Neutral	·942	6·4	8·3
12	Slightly acid	·927	Slightly acid	·930	6·4	8·3
13	Acid	·930	Acid	·934	6·2	8·0
14	Slightly acid	·930	Neutral	·950	5 8	7·5
15	Slightly acid	·950	Very acid	·943	2·3	3·0
16	Slightly acid	·942	Acid	·933	5·0	6·5
17	Slightly acid	·934	Very acid	·967	3·8	4·9
18	Acid	942	Neutral	·933	·8	1·0
19	Slightly acid	·927	Very acid	·937	4·4	5·7
20	Acid	·942	Neutral	·955	6·0	7·8
21	Acid	·930	Very acid	·959	Cinchonidine	
22	Slightly acid	·927	Acid	·930	5·7	7·4
23	Acid	·927	Slightly acid	·934	5·5	7·2
24	Acid	·942	Slightly acid	·942	5·8	6·8
25	Slightly acid	·930	Neutral	·938	6·2	8·1
26	Slightly acid	·925	Neutral	·938	6·4	8·3
27	Slightly acid	·930	Neutral	·934	5·6	7·3
28	Slightly acid	·938	Neutral	·931	4·8	6·2
29	Slightly acid	·934	Neutral	·942	6·0	7·8
30	Slightly acid	·938	Neutral	·942	5·8	7·5
31	Acid	·950	Neutral	·967	6·4	8·3
32	Acid	·971	Acid	·950	6·9	2·5
33	Acid	·930	Neutral	·934	6·4	8 3
34	Acid	·950	Neutral	·950	5·6	7·3
35	Acid	·942	Very acid	·932	6·2	8·1
36	Acid	·936	Acid	·932	6 0	7·8
37	Acid	·958	Very acid	·934	6·4	8·3
38	Acid	·922	Neutral	·950	6·0	7·8
39	—	—	Very acid	·967	3·8	5·0
40	—	—	Neutral	·938	6·4	8·3
41	—	—	Neutral	·938	6·2	8·1
42	—	—	Neutral	·963	6·1	8·0
43	—	—	Neutral	·946	5 0	6·5
44	—	—	Neutral	·957	6·1	8·0

The PRESIDENT, in moving a vote of thanks to Mr. Wright, said the results he had arrived at were well worthy of attention. The fact that the hydrochlorate of

quinine was better suited for making the tincture than any other salt was corroborative of what had been found by other investigators, and it was quite what he should expect from considerations of the chemical properties of the salts. If the orange peel contained lime, which it certainly did and Mr. Wright had proved that it was contained in the outer part of the rind much more abundantly than the inner, it was evident that the using of a salt of quinine which would not be affected by the lime naturally contained in the orange peel was very important.

Mr. MARTINDALE said he could corroborate what the author had said in the paper. The only other salt which could be used was the hydrobromate which in some respects was better than the hydrochlorate. He hoped that in the future pharmacopœia, either the hydrochlorate or the hydrobromate would be introduced, for they were both useful salts for dispensing purposes.

Mr. BORLAND said he remembered some years ago a statement being made in the Journal that if proof spirit were used of the proper strength there was no difficulty in preparing tincture of quinine according to the Pharmacopœia, but he certainly could not corroborate that statement and entirely agreed with what was stated in the paper that sulphate of quinine used with the tincture of orange would sometimes throw down a copious precipitate let the strength of the spirit be what it might. For some years past he had used hydrochlorate of quinine with great advantage.

Mr. BENGER said the author pointed out that proof spirit would dissolve only about 5·7 grains of sulphate of quinine to the ounce, and that it was a salt of lime, which existed principally in the outer portion of the orange peel, which separated the remainder of the quinine from the sulphate and enabled it to dissolve in the tincture. If the tincture were made with rectified spirit instead of the tincture of orange peel the proper quantity of sulphate of quinine would not be dissolved.

The following two papers were then read by Mr. Plowman:—

NOTE ON "CHINA BICOLORATA" OR "TECAMEZ BARK," WITH SUGGESTIONS AS TO ITS PROBABLE BOTANICAL ORIGIN, AS INDICATED BY ITS BOTANICAL, CHEMICAL AND MICROSCOPICAL CHARACTERISTICS.

BY JOHN HODGKIN, F.I.C., F.C.S.,

Mem. Soc. Chem. Industry, Medallist in Chemistry, University College, London.

An opportunity has lately been afforded me of investigating this most interesting bark, of which after the lapse of many years a small consignment has recently appeared. But before giving the results of my examination, it will be interesting to recapitulate and epitomize the information that has already been published in various journals and handbooks since its discovery.

In the first place then, this bark comes from Tecamez or Atacamez, which lies west of Ibarra on the western declivity of the Cotocacha, in Ecuador.* Here it was discovered in 1793 by Dr. D. Brown, a ship's surgeon, and a description of it with an illustrative plate was duly published in Lambert's 'Description of the Cinchona Genus,' 1797 (f. 30, tab. ii.). It appears to have been recommended as a useful tonic, in a medical work published in 1824, by Dr. Brera, of Padua. Having thus attracted attention, it was submitted to a careful examination by MM. Pelletier, Pétroz and Vauquelin, and their elaborate report appears in the *Journal de Pharmacie* for Oct. 1825 (pp. 449–462). M. Pelletier states that 100 parts contain 16 parts soluble in alcohol, of which 14·65 is "bitter substance" and 1·35 "resin," but they were unable to find any quinine, in which opinion they have been confirmed by Pfaff, v. Santen and others, and still later Dr. Hesse, who states* "that it is altogether destitute of alkaloids." Goebel and Kunze,† give an illustration, and a good description of the bark (to which I shall allude later on), and state that Humboldt saw the tree from which the bark is obtained, and was of opinion that its botanical origin was to be sought amongst Cinchonas or Exostemmas, in which opinion M. Weddell‡ tentatively coincides, and whilst Guibourt§ is of opinion that it is a *Stenostomum*, Markham‖ thinks it is probably a *Pinkneya*. Now I propose to attempt to demonstrate by a chain of evidence from different sources, microscopical, botanical and chemical, that there is a greater probability in its being a *Remijia* than any of the above mentioned species. It is best first of all to describe the bark, and to do this I cannot do better than give Goebel and Kunze's description with slight amplifications where necessary. "The 'Pitoya' bark," as they term it, "comes in rolls 4 to 24 inches long, sometimes singly, sometimes many times rolled, and occasionally rolled together. The outer surface is smooth, and extremely finely wrinkled in the direction of the length, sometimes more so, sometimes less so, of a brownish or greyish yellow, with white or grey patches, occasionally spiraliform, encircling the quills, and generally the bark is studded with little warts. The interior surface is smooth, generally of a brownish black colour: occasionally, however, pieces are to be met with of a reddish brown colour. The Pitoya bark is composed of three portions:—(1) The epidermis; (2) the orange-coloured bark; (3) a thin layer of fibre (*Bastlage*). The lower black surface, which is scarcely $\frac{1}{10}$ of a line in thickness, can be removed by a knife, on soaking the bark, and is composed of fibre. The diameters of the quills range from 4 lines to 1½ inch (*Zoll*), and the thickness from ¼ to 1½ lines. One never finds flat pieces, the least so which I have hitherto seen were still feebly bent inwards. The cross fracture is only slightly uneven, the longitudinal fracture is harsh, and often somewhat short splintering. The taste is disagreeable and intensely bitter, strongly inducing saliva. Of odour, I could distinguish nothing. The bark yields a fine cinammon-coloured powder."

Thus says Kunze,¶ and his description certainly does not leave much to add. I would, however, remark that the sample I had was not so elegantly rolled, and appears to have been removed with less care. Some pieces have a whitish "coat," somewhat loosely attached to the bark, which, as it curls up in drying, loses this epidermis in tranverse stripes, giving a somewhat "zebra" appearance. Some of the larger pieces on the interior present rather a remarkable appearance, longitudinal fissures, at an equal distance having been caused by the drying of the evidently somewhat "fleshy" bark. Such pieces are, however, the exception rather than the rule, as by far the greater portion dries with the smooth dark-coloured interior. The microscopical section of the bark, Dr. A. Vogl** has pointed out, closely resembles that of *Remijia pedunculata*, and he gives drawings of these two sections for comparison, and certainly there is a very striking analogy. Vogl does not offer any suggestions as to the real origin, but simply notes the fact of the resemblance to "cuprea," but, Humboldt, who actually saw the tree, was of opinion that it belonged to the Exostemmas or Cinchonas. But be it borne in mind that at that time, this

* Clements R. Markham, C.B. F.R.S., etc., 'The Cinchona Species of New Granada,' 1867, p. 104.

* *Vide* 'Pharmacographia,' 1874, p. 321. Flückiger and Hanbury.

† 'Pharm. Waarenkunde,' 1827–29, i., p. 84. Tafel xii., fig. 6 and 7.

‡ 'Hist. Natur. des Quinquinas,' Paris, 1849, p. vii.

§ 'Hist. des Drogues,' iii. (1869), 190, (Quinquina Bicoloré).

‖ 'Chinch. Species, N. Granada,' p. 104.

¶ Goebel and Kunze, 'Pharm. Waarenkunde,' Eisenach, 1827. vol. i., pp. 84-86.

** Dr. A. Vogl, 'Beiträge zur Kenntniss der sogenannten falschen Chinarinden.' Wien, 1876, p. 11.

latter group included the *Remijias*, which were not then so perfectly understood as they are to-day. In Lambert's illustration of the leaves of the Tecamez bark, the leaves are seen to be of a peculiarly pointed form, closely tallying with the form of the leaves of *Remijia pedunculata*, as given in Karsten.* We have thus microscopical and botanical evidence from undoubtedly trustworthy sources which, when noticed in conjunction, and I believe that they have not hitherto been noticed together, are rather suggestive of the possibility of the Tecamez bark being a *Remijia*. Now I am, through a fortunate concatenation of events, enabled to offer such fresh additional evidence as I think will materially tend to strengthen, if not absolutely confirm, this hypothesis.

In the first place, then, I must mention that among the numerous importations of "cuprea" bark, there has come occasionally a small parcel of a "cuprea," of very different appearance to the ordinary *R. pedunculata*. The bark is of a much more orange red, instead of the dull lake of the ordinary "cuprea bark" of commerce; it comes in very thin, broken quills, or small pieces, and gives almost the appearance of cuprea "shavings." The bark is of fine quality as regards its percentage of quinine. It comes from the State of Tolima (Colombia), and is cut from trees which are very sparsely found, and thus far it does not appear that a large supply will come from that district. It is shipped from Barranquilla, like all bark of the same description. It is evident, from a careful examination of some hundredweights of this bark, that the tree is a small one in comparison with the *R. pedunculata*, and the pieces seem relatively but little larger than the *China bicolorata*, to which with the exception of the colour, it bears a strong family likeness. In fact this bark, the scientific name of which I am unaware of, seems to stand almost midway between *China bicolorata* and *R. pedunculata*. The exterior surface is, it is true, a great deal more longitudinally wrinkled; the interior surface is very similar.

Secondly, then, I must state that my analysis of the *China bicolorata* entirely contradicts the experience of previous observers, for not only does the bark contain 0·75 per cent. of alkaloids, but they are cinchona or remijia alkaloids. The bark contains also chinovine and chinic acid, which I obtained in the characteristic lime salt, and identified; the mother-liquor of these crystals smelt strongly of the peculiar odour of "Almaguer bark." The actual analysis is as follows:—

Quinine sulphate	0·34 per cent.
=Quinine	0·255 „
Cinchonidine	—
Homoquinine	—
Cinchonine	0·06 „
Quinidine	0·05 „
Amorphous alkaloids	0.39 „

The quinine was carefully identified by the usual tests. Homoquinine or cinchonidine I was unable to find, but the absence of this latter alkaloid is negative evidence in favour of the Remijia theory. To summarize, we have then the following facts:—(1) *Microscopical*: The evidence of Vogl as to the great analogy of the *China bicolorata* and *Remijia pedunculata* sections. (2) *Botanical*: (α) Humboldt's classification amongst the Cinchonas (which then included Remijias) or Exostemmas (this latter theory is now definitely abandoned on account of important botanical dissimilarities since recognized, *e.g.*, the shape of the flowers, etc., etc.); (β) Lambert's evidence as given in his drawings of the leaves, which bear such a strong resemblance to Karsten's *Remijia pedunculata*; (γ) the "family likeness" between the above-mentioned rare Tolima *Remijia* and the *China bicolorata*. (3) *The chemical evidence*: The presence of alkaloids which hitherto have only been found in either Cinchonas or Remijias.

From this evidence, drawn from so many sources of so distinctive a character, there can, in my humble judgment, be only one conclusion, namely, that the "*China bicolorata*" is in reality a true Remijia, and I, therefore, suggest for the consideration of professional botanists and quinologists whether it would not be well that it should no longer occupy a position of "greater freedom and less responsibility" under the vague term "*China*,"* but that it should boldly assume its botanical "responsibilities," and be known henceforth as "*Remijia bicolorata*."

* 'Flora Columbiæ,' etc. Berolini, 1858.

Analyses of Some Old Cinchona Barks.

BY DAVID HOOPER, F.C.S.

Among a number of cinchona barks I have recently had occasion to analyse, the results obtained from four samples of an authentic source appear worthy of publication. These barks were some which had been given by Mr. McIvor, the late superintendent of the Madras plantations, to Dr. de Vrij, in the year 1874. Dr. de Vrij, in handing them to me for analysis, remarked that he had had them by him since that time, but no opportunity had presented itself for verifying the statements made on two of the packages.

Each sample was carefully marked in Mr. McIvor's own handwriting, with the following description:—

1. Mossed bark of *Cinchona officinalis*. Contains no quinine.
2. Renewed bark of *C. officinalis*. Contains no quinine.
3. Renewed bark of *C. officinalis*, var. *Uritusinga*.
4. Renewed bark of *C. pubescens*.

The specimens were in thick single and double quills, but their physical characters were not deemed worthy of exact scrutiny. They were all in a good state of preservation.

They yielded respectively 9·9, 9·5, 9·5, and 9·7 per cent. of hygroscopic moisture at 100° C., and gave, on analysis, the following alkaloidal composition.

	1.	2.	3.	4.
Quinine	0·84	—	2·04	4·13
Cinchonidine	1·13	—	2·44	1·53
Quinidine	0·46	1·99	0·38	0·06
Cinchonine	0·71	0·68	0·99	0·49
Amorphous	1·88	2·90	0·53	0·77
Total	5·02	5·57	6·38	6·98

The No. 1, although not so bad as described, is much poorer than one would expect from an *Officinalis*. No. 2 is peculiar in the large amount (2 per cent.) of quinidine it contains. Mr. J. C. B. Moens, in 'Kinacultuur in Azië,' records 1·2 per cent. as the maximum quantity of quinidine in several estimations of this species, and that he found in the root-bark. Quinidine in such amount occurs in a variety of *Ledgeriana* bark to which the name *Quinidifera* has been applied, and Dr. de Vrij has found in some Java plants of *C. Calisaya* a few yield over 2 per cent. The amorphous alkaloids in bark No. 2 are also remarkably high. The fourth analysis indicates a very satisfactory yield of alkaloid, both in total amount, and in quantity of quinine. It agrees substantially with the analyses of *C. pubescens* made by Dr. Paul, in the early part of this year, notwithstanding the interval of about ten years between the times of collection. I have heard, on good authority, that *Cinchona pubescens* is a fast grower and fairly constant in alkaloidal contents. Several cuttings have recently been planted in the Nilgiris, and the result will be looked forward to with some interest. Among the large number of cinchona barks that will be candidates for a place in the new pharmacopœia, the *pubescens* species certainly possesses many recommendations in its favour.

In conclusion, I must express my obligations in being allowed to conduct the above analyses in the laboratory of Dr. W. F. Koppeschaar in the Hague.

* The synonyms for this bark are many, viz., China bicolorata, China Pitoya, Ch. Tecamez, Ch. Atacamez, Pitoya bark, Tecamez or Atacamez bark, China bicoloré, Zwei farbige China, etc., etc.

The PRESIDENT, in proposing a vote of thanks to both these gentlemen, said Mr. Hodgkin was himself connected with one of the most important quinine manufacturers in the country, and therefore any communication from him was of great interest, apart from its own intrinsic value. He was connected with the firm of the late Mr. Eliot Howard, a highly respected contributor to the Conference and to the Pharmaceutical Society.

Mr. NAYLOR asked if Mr. Hooper's paper contained any details of the method employed for estimating the alkaloids.

The PRESIDENT said he did not go into details.

Mr. ELBORNE said the former paper was one of considerable importance. He should like to know whether this Tecamez bark was imported in large quantities, and whether it closely corresponded to the modern cuprea bark which, as at present imported was, he believed, considered to be afforded by two species of *Remijia*, the *R. pedunculata* and the *R. Purdieana*. This paper tended to show that cuprea bark was afforded by a third variety, which the author proposed to call *R. bicolorata*. Another question which occurred to him was whether this bark came from the same part of the world as ordinary cuprea bark, which he believed came from the region of Bucaramanga and certain tributaries of the Orinoco.

Mr. PLOWMAN, in reply to Mr. Elborne, said from one of the statements in the paper it appeared that this was not a common article of commerce. It came from Tecamez, which was on the western declivity of Cotocacha in Ecuador. This was not very distant from the Orinoco, so that practically the geographical source might be said to be fairly identical.

The following paper was read by Mr. Benger:—

SESAME OIL AS A BASIS FOR LEAD PLASTER.

BY THOMAS MABEN,

Pharmaceutical Chemist.

At the last meeting of the Conference, two reports were submitted with reference to the suitability of sesame oil for pharmaceutical purposes. The conclusions arrived at by the writers, Mr. Conroy, F.C.S., and myself, were for the most part very similar, the only exception being that Mr. Conroy found the oil unsuitable as a basis for lead plaster, whereas my experiments had led me to form an opposite opinion.

The feeling of the meeting seemed to be in favour of Mr. Conroy's position, but the question was by no means finally settled; and as it is of considerable importance, even apart from its pharmaceutical aspects, I have ventured, at the risk of being thought troublesome, again to take it up in the hope of being able to make clear what is at present somewhat doubtful.

Mr. Conroy found that lead plaster prepared with sesame oil, in B.P. proportions, was dark in colour and much too soft. In my paper, I remark that the plaster can be prepared with sesame oil, provided we employ a larger proportion of lead oxide than is ordered by the Pharmacopœia; so prepared, it is darker in colour, less friable and more adhesive than the official plaster. In the discussion that followed the reading of the reports, Mr. Conroy's conclusions were confirmed by Mr. Tanner, who added that his own experience was that the plaster had the further disadvantages of a disagreeable odour, and when spread, a tendency to become rancid. Having prepared many samples of sesame lead plaster before writing my paper, I was not at all surprised to hear that when the B.P. proportions were adhered to, the result was bad alike in colour, consistency and odour. So far then, I am quite at one with both Mr. Conroy and Mr. Tanner.

The reason why the plaster should be so soft is to be found in the very large percentage of olein in the sesame oil. This was Mr. Conroy's explanation of the fact, and it seems to me to be the only explanation possible. Owing to the lead oxide not being in sufficient quantity to saponify all the oleic acid, a certain proportion of the latter is always present in the free state, and this evidently accounts not only for the softness, but also for the rancidity. It is, therefore, only natural to expect that by increasing the proportion of base as much as is necessary to ensure complete saponification, there would be no difficulty in obtaining lead plaster from sesame oil. It would indeed be very remarkable, and from a chemical point of view exceedingly interesting, if sesame and olive oils gave quite different reactions under the conditions in which the plaster is prepared. As a matter of fact, saponification of either oil is perfectly possible, and to show that this is so, I have prepared a number of specimens, some of which are now on the table.

The oil made use of was, I have every reason to believe, perfectly pure. It was got for the purpose from Messrs. Evans and Co., Liverpool, and Mr. Conroy having kindly examined it previous to its being sent off, certified to its genuineness so far as he could judge.

The specimens were prepared as follows:—

No. 1 Sesame oil plaster; the lead oxide in B.P. proportion.
„ 3 „ lead oxide increased 10 per cent.
„ 5 „ „ 20 „
„ 6 „ „ 25 „
„ 7 „ „ 30 „
„ 8 „ „ 40 „
„ 9 „ „ 50 „
„ 10 „ prepared in May, 1883.
„ 11 olive oil plaster, prepared in June, 1884, B.P.
„ 12 „ commercial specimen, B.P.

With the exception of Nos. 10 and 12 all the specimens were prepared in June of this year.

It is evident that Nos. 1, 3, 5 and 6 are much too soft, and the same may said of Nos. 7 and 8. A year hence these latter may be in a condition to keep their shape in rolls, even in summer, but the attempt would not at present be very successful. No. 9 keeps quite well either spread or in roll, and in general appearance compares very favourably with either of the B.P. plasters, Nos. 11 and 12. Nos. 9 and 11 were both prepared under identical conditions, towards the close of June, when the thermometer was registering 75° in the shade. No. 10, in which the proportion of lead oxide is increased at least 40 per cent., is more than a year old; it is a very fair specimen, and quite good enough to be used as a basis for other plasters. The softer plasters are of course quite rancid, though they are moderately white in colour.

In the hands of regular manufacturers, and with appliances for the purpose, a very good plaster might be made by using the same proportions as in No. 8, but the scale on which I prepared it is too small to admit of very definite opinions being formed regarding it.

The specimens of official plaster are not so white and friable as the plasters of commerce sometimes are. No. 11 is quite as good a plaster as No. 12, which was recently got in the regular course of business from a first class house. Nos. 9 and 10 appear to be quite equal to these (No. 11 and 12) in every respect, though it would obviously be unreasonable to compare any new sesame plaster with the pure white article that we occasionally meet with, since the natural effects of age, not to speak of improved methods of preparation, will quite account for the difference both in colour and consistency.

In conclusion, I have only to add that the further experiments required for this supplementary report enable me to form a much more decided opinion in favour of sesame oil as a basis for lead plaster than I was in a position to give expression to a year ago.

The large proportion of lead oxide required may doubtless sometimes be a disadvantage, but the fact that we get a much purer oleate in sesame plaster than in that prepared from olive oil ought in certain circumstances to be in favour of the former.

The PRESIDENT, in moving a vote of thanks to Mr. Maben, said he would offer no opinion on the question himself as he had no practical knowledge of it, but he would not propose to use sesame oil in pharmaceutical preparations unless it were recognized and specified. He thought some of the specimens were rather too high in colour to be satisfactory.

Mr. GERRARD said he had some experience both in plaster making and spreading, and he had tried numerous oils for the purpose of manufacturing a lead plaster. He was of opinion that there were several natural oils besides olive oil which were admirable for the purpose, and that they need not confine themselves exclusively to olive oil. Of course it had become customary to use olive oil, and it must be continued for lead plaster whilst the present formula remained in the Pharmacopœia; but, nevertheless, pharmacists were in a position to discuss the properties of other oils, and there were others which would yield equally as good plasters as those made from olive oil. He had had no experience of sesame oil, but he had used nut oil and prepared from it an excellent plaster which had keeping and adhesive properties. Lead plaster prepared from the British Pharmacopœia processes in the quantities there indicated was by no means a good preparation, as it did not contain sufficient oxide of lead, and the consequence was a neutral, or anything like a neutral oleate of lead was not obtained, but one which contained an excess of oleine and was prone to decomposition, readily becoming a rancid and, consequently, irritating application. Such a plaster underwent in certain circumstances, especially in summer weather, and if spread and packed up in large quantities, what was called heating. He had spread 400 or 500 yards at once, and in packing such plaster in a large drawer, the rolls lying on each other, he found when hot weather set in the plaster became very hot. This change was probably due to the fact that there was an excess of oil, and there was some oxidation going on through the formation of oxy-oleates. This was hastened to some extent by the presence of water, and much lead plaster that was sold contained mechanically retained water, it being sent out in this form because it had a whitish appearance given by the emulsification of the water in it. If lead plaster were prepared from which water was eliminated it became a dark transparent colour, not attractive to the eye by any means, but one which would give the surgeon far greater satisfaction than a plaster which contained emulsified water. That usually sold by chemists had that nice whitish surface, and on the back a great quantity of sulphate of lime or other material used as backing, which made the plaster so exceedingly stiff that it was not well adapted for surgical operations. A surgeon would reject that kind of plaster for strapping up a limb, but if you spread a plaster of the transparent kind, from which all the water was eliminated, it lent itself most admirably to the irregularities of the limb, adhered well and retained its properties for a maximum period. The great object in a lead plaster was to obtain one which should be permanent and adhere for a considerable time.

Mr. NAYLOR said he could endorse a good deal of what Mr. Gerrard had said, but he was surprised at the reflection which was thrown on some plaster manufacturers. He had never found any difficulty in preparing a plaster which was white, such as Mr. Gerrard indicated, but had never known the use of sulphate of lime. There was very little difficulty in obtaining the whitish appearance on a manufacturing scale; it was merely a matter of manipulation. He found in using oxide of lead a little more water was sometimes required to effect complete saponification with some litharge than with others, and in such circumstances one was warranted in using that extra water, but it had no business to be left in the finished plaster. If it were, he should put it down to defective manipulation.

Mr. BENGER said he was under the impression that the whitish appearance was produced by pulling the plaster in the same way as sugar was pulled.

Mr. HASSELBY said some time ago he set about making a little *emplastrum plumbi* according to the Pharmacopœia; he took the olive oil out of the oil cistern and the litharge out of the usual litharge jar, so the conditions were those of an ordinary commercial character. It was well boiled, but he was not satisfied with its hardness and boiled it again and again. At last he took it out, and he and his apprentice had one or two hours' good pulling at it, and they did their best to make as good a sample as they bought from the wholesale houses, but failed to do so. It struck him that his olive oil must have some sesame in it, though possibly it might be something else. He understood that if there were any carbonate with the litharge,—which should be pure oxide,—complete combination was not effected, and he intended reboiling it with fresh oxide and endeavouring to make it over again. The experiment of Mr. Maben showed very clearly that there might be something in the oil cistern as well as in the oxide of lead. After all he thought the wholesale houses sent out lead plasters slightly too hard, and that if they were produced a little softer it would be better for the customer who used them, and it would certainly be better for the young man who had to weigh them up.

Mr. WRENN said he could quite confirm what had been said by Mr. Naylor, who he knew was accustomed to see large quantities of this plaster made. He never thought of emulsification of water; it was simply the process of manipulation by which the whiteness was obtained and the formula of the British Pharmacopœia was followed as completely as possible.

The PRESIDENT said it was well understood that the so-called bleached shellac was produced by the introduction of water into it, and probably from that the idea arose that in the lead plasters a little water might also produce a whitish appearance. He was not at all clear what the molecular condition might be which gave this whiteness, but it was evident some makers made much whiter lead plasters than others, though it did not at all follow that the whiter was the better plaster for surgical use; he should rather fancy a darker and softer plaster himself.

Mr. CLARK said there was no difficulty in making a very handsome white plaster precisely according to the Pharmacopœia if good oil and good litharge were used, but some little labour was required.

(*To be continued.*)

Obituary.

Notice has been received of the death of the following:—

On the 13th of March, Mr. Henry Field, Chemist and Druggist, St. Leonards. Aged 35 years.

On the 6th of August, Mr. Edmund Ledger, Chemist and Druggist, New Shoreham. Aged 78 years.

On the 7th of August, Mr. Samuel Bill, Chemist and Druggist, Bloxwith. Aged 76 years.

On the 10th of August, Mr. John Allwood, Chemist and Druggist, Stafford. Aged 64 years.

On the 23rd of August, Mr. Joseph Smith, Chemist and Druggist, Liverpool. Aged 61 years.

On the 5th of September, Mr. John Parton Berry, Chemist and Druggist, Northampton. Aged 53 years.

On the 6th of September, Mrs. Eliza Tyers, Chemist and Druggist, Leicester. Aged 71 years.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. J. Rymer Young, A. K. Aves, W. H. Westmorland, John R. Hill, C. F. Wilson, W. Martindale, Arthur J. Ferrall, G. Roberts, J. R. Philpott, C. A. Griffiths, Glaisyer and Porter, Theo. Weaver, S. M. Marlor, E. W. Forrest.

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10.	The Aerial Respirator, Silver-plated, Ladies'	Oval	,, 5/-	,, 1 10 0
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14.	Gold-plated Wire, full size	,,	,, 7/6	,, 2 8 0
15.	Gold Plates, full size	,,	,, 7/6	,, 2 8 0
16.	Orinasal, Silver-plated Wire	Square	,, 4/-	,, 1 10 0
17.	Ladies' Miniature, Silver-plated	Oval	,, 5/-	,, 1 10
18.	,, ,, Gold plated	,,	,, 6/-	,, 2 2
19.	The Manifold Respirator, of variable power, containing 6 Metallic Plates, 4 of which are moveable, Gold-plated	Square	,, 10/6	,, 3 12 0
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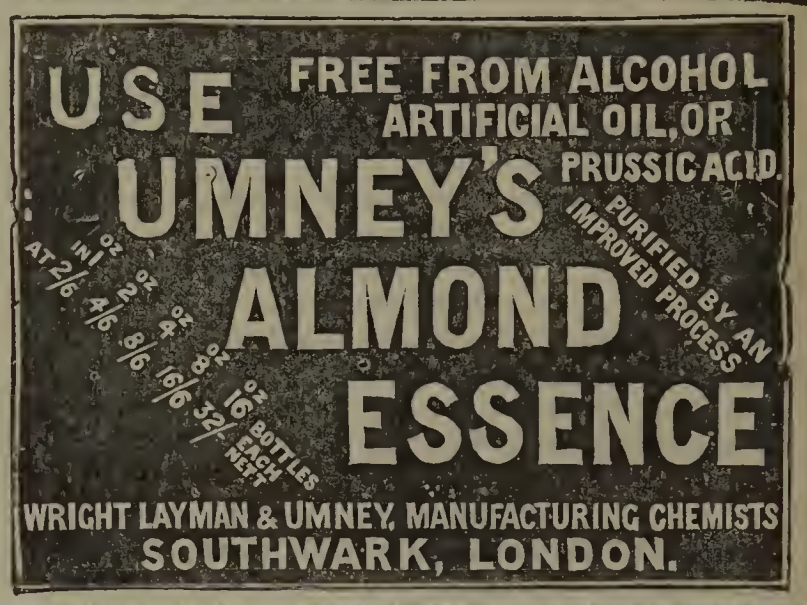

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The London Hospital and Medical

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Full particulars as to Courses of Study, Examinations, &c., may be obtained from the Registrar. An Entrance Examination in Arts (recognized by the General Medical Council) will be held in the Owens College on Monday, October 6th, and following days. Candidates will be required to pay a fee of £1, and to furnish the Registrar with a certificate from their last instructor or some other suitable person, stating that they are proper persons to be admitted to the Examination. Attendance to receive fees and to enter students for the Examinations on September 30th, October 1st and 2nd, from 10 a.m. to 1 p.m., and from 2 to 4 p.m.

A. T. BENTLEY, M.A., Registrar.

OWENS COLLEGE, MANCHESTER.

Prospectuses of the Pharmaceutical Courses in the Session 1884-5 will be forwarded on application.

J. HOLME NICHOLSON, Registrar.

NEW VETERINARY COLLEGE

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The WINTER SESSION, 1884-85, will commence on WEDNESDAY, the 22nd October.

Principal, W. WILLIAMS, F.R.C.V.S., F.R.S.E., &c., &c., author of "Principles and Practice of Veterinary Surgery," and "Principles and Practice of Veterinary Medicine."

Prospectus and full particulars on application to the Secretary

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ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 47 out of 51 Pupils passed the last Examinations.

The Middlesex Hospital Medical

SCHOOL.

The WINTER SESSION, 1884-85, will open on Wednesday, October 1st, at 3 p.m., with an Introductory Address by Dr. David W. Finlay, B.A. After the Lecture the Prizes awarded during the previous Winter and Summer Sessions will be distributed.

The ANNUAL DINNER of the past and present students and their friends will take place the same evening at St. James's Hall, at 6.30, Henry Morris, Esq., in the chair.

HOSPITAL STAFF.

Consulting Physicians—Dr. Henry Thompson, Dr. Goodfellow, Dr. Greenhow, F.R.S.
Physicians—Dr. Cayley, Dr. Coupland, Dr. Douglas Powell.
Assistant Physicians—Dr. D. W. Finlay, Dr. J. K. Fowler, Dr. C. Y. Biss.
Obstetric Physician—Dr. Arthur W. Edis.
Physician to the Skin Department—Dr. Robert Liveing.
Assistant Obstetric Physician—Dr. W. A. Duncan.
Consulting Surgeons—Mr. Shaw, Mr. Nunn.
Surgeons—Mr. Hulke, F.R.S., Mr. George Lawson, Mr. Henry Morris.
Assistant Surgeons—Mr. Andrew Clarke, Mr. A. Pearce Gould.
Ophthalmic Surgeon—Mr. William Lang.
Aural Surgeon—Mr. Arthur Hensman.
Consulting Surgeon Dentists—Mr. Tomes, F.R.S., Mr. J. S. Turner.
Dental Surgeon—Mr. Storer Bennett.
Assistant Dental Surgeon—Mr. Claud Rogers.
Curator of Museum and Pathologist—Dr. J. K. Fowler.
Registrars—Dr. J. J. Pringle, Mr. W. Roger Williams, F.R.C.S.
Chloroformist—Mr. G. Everitt Norton.
Resident Medical Officer—Mr. E. A. Fardon.

LECTURERS.

Principles and Practice of Medicine.—Dr. Cayley.
Principles and Practice of Surgery—Mr. Morris, M.A., M.B.
Practical Surgery—Mr. Andrew Clark.
Physiology and General Anatomy—Mr. B. Thompson Lowne, F.L.S.
Descriptive and Surgical Anatomy—Mr. Arthur Hensman.
Chemistry—Mr. W. Foster, M.A. Cantab.
Pathological Anatomy—Dr. Coupland.
Clinical Lectures on Medicine—Dr. Cayley, Dr. Coupland, Dr. Douglas Powell.
Ditto on Surgery—Mr. Hulke, F.R.S., Mr. George Lawson, Mr. Morris.
Ditto on Diseases of Women and Children—Dr. Arthur W. Edis.
Dissecting Room—Mr. Hensman, Mr. J. B. Sutton, and Mr. W. E. Wynter.
Midwifery and Diseases of Women and Children—Dr. Arthur W. Edis.
Materia Medica and Therapeutics—Dr. Thorowgood.
Medical Jurisprudence—Dr. D. W. Finlay, B.A.
Botany—Dr. Biss, M.A. Cantab.
Practical Chemistry—Mr. W. Foster, M.A. Cantab.
Practical Physiology and Histology—Mr. B. Thompson Lowne, F.L.S.
Public Health—Dr. D. W. Finlay, B.A.
Psychological Medicine—Mr. Henry Case.
Comparative Anatomy and Zoology—Mr. J. B. Sutton.
Dermatology—Dr. R. Liveing, M.A. Cantab.
Clinical Lectures on Diseases of the Eye—Mr. William Lang.
Practical Demonstrations on Diseases of Women and Children—Dr. W. A. Duncan.
Ditto on Diseases of the Throat and Ear—Mr. Hensman.

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There are nine Resident Clinical Appointments open to Students of the Hospital annually. Two Entrance Scholarships of the annual value of £25 and £20 respectively, each tenable for two years, and an entrance Science Scholarship, value £50, are awarded at the commencement of the Winter Session. Two Broderip Scholarships of the annual value of £30 and £20 respectively, each tenable for two years, are also awarded every year for proficiency in Clinical knowledge. The Murray Scholarship in connection with the University of Aberdeen, is awarded every third year. The Lyell Medal, value about five guineas, is awarded annually to second year Students. An Exhibition value Ten Guineas is open to Students at the end of their first year.

The Governors' Prize of Twenty Guineas is annually given to the Student who, at the end of his third winter not obtaining a Broderip Scholarship, shall pass the best Clinical Examination. Class Prizes are also given.

Clerkships and Dresserships are awarded without fee, and the Clerk or Dresser of the week dines at the Board-room table to have the opportunity of seeing accidents that may be admitted during the evening.

A limited number of general Students are also under certain conditions, allowed this privilege.

The Tutors assist all general Students, especially those preparing for their examinations, and thus the necessity of obtaining private instruction is obviated.

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For Prospectus and further information, apply to the Dean, or the Resident Medical Officer, at the Hospital.

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PASS LIST FOR THE SESSION 1883-84.

MAJOR.

Messrs. H. S. Collins, T. S. Cornwell, E. J. Evans, W. Longtoft, S. Marshall, T. Randall, W. T. Sergent.

MINOR.

October.	December.	February.	April.	June.	July.
Messrs.	Messrs.	Messrs.	Messrs.	Messrs.	Messrs.
F. Barton	G. H. Bradford	J. Alderton	W. G. Atkinson	J. E. S. Burn	A. Banks
W. H. Beck	E. M. Brown	S. Arthur	G. M. Dunn	C. G. Davies	W. Barker
G. W. Briggs	H. R. Dorning	W. Barratt	J. Christie	J. R. Evans	T. N. Brooke
J. W. Burn	E. H. Taylor	J. Bates	B. Carter	L. J. W. Jones	B. H. Butler
W. Cole	R. Brown	S. G. Baker	G. P. Chifney	W. G. Sloan	W. Clarke
D. Davies	W. Jackson	W. J. Baker	H. F. Drake	G. Stevenson	C. Ellis
C. A. Hedley	A. E. Smith	J. Black	J. W. S. Freshney		H. C. Glanville
R. S. Hutton	R. H. Playford	T. Cockerell	F. O. Golding		W. H. Godsland
J. L. Jones	C. Ray	W. C. Collen	T. Groves		E. E. Hall
J. H. Jones	J. Richardson	W. Cumberbirch	G. E. Hare		J. H. Hopper
J. R. Jones	R. Roberts	R. O. Hayes	A. M. Hickley		A. J. Hemstead
S. Marshall		G. G. Jackson	G. Hodgson		J. Hulland
D. J. Owen		B. John	T. Jenkins		S. Huggins
H. T. Price		J. P. Leach	T. Lewis		G. Jacques
F. A. Rutherford		A. Mackay	J. F. Marlar		J. K. Jones
S. Sharp		W. H. Miller	H. E. Russell		R. M. Lewis
A. N. Smith		R. Parry	W. G. Skoulding		C. O. Morrison
C. L. Smout		J. Peacock	J. A. Sutcliffe		G. Moor
J. E. Turner		J. H. Potter	J. W. Taylor		G. Neale
T. S. Wokes		G. Sapsed	A. Tennant		J. Newton
		J. R. Shallcross	A. J. Timbury		F. Rookledge
		M. A. Sinclair	E. H. Tugwell		F. T. Sanders
		C. B. Southwell	L. Verdon		B. Smith
		W. Spratling			J. Sturdy
		E. Wookey			W. Sumner
					T. E. Taylor
					A. Waldron
					H. P. Withers
					H. E. Young

PRELIMINARY.

Messrs. A. H. Carpenter, R. Colwell, N. Couve, W. S. Edwards, A. P. Evans, F. C. Ford, A. S. Glover, S. R. Hallam, E. J. Harvey, G. Heaton, A. Minet, A. T. Reilly, G. Roe, W. J. Rugg, H. F. Stebbing, W. Thorley, C. E. Treharne, E. Turpin, T. F. Webster.

TOTALS: Major 7, Minor 114, Preliminary 19.

For Revised Prospectus and further particulars, apply personally or by letter to

Messrs. WILLS & WOOTTON,

WESTMINSTER COLLEGE, TRINITY SQUARE, BOROUGH, LONDON, S.E.

Guy's Hospital.—The Medical Session

commences on Wednesday, October 1st.

The Hospital contains besides the beds for Medical and Surgical cases, wards for Obstetric, Ophthalmic, and other special departments.

Special Classes are held in the Hospital for Students preparing for the Examinations of the University of London and of other examining boards.

APPOINTMENTS.—The House-Surgeons and House-Physicians, the Obstetric Residents, Clinical Assistants and Dressers are selected from the Students according to merit and without payment. There are also a large number of Junior Appointments, every part of the Hospital Practice being systematically employed for instruction.

ENTRANCE SCHOLARSHIPS.—Open Scholarship of 125 guineas, in Classics, Mathematics, and Modern Languages. Open Scholarship of 125 guineas, in Chemistry, Physics, Botany, and Zoology.

PRIZES, &c.—Six Scholarships, varying in value from £10 to £50 each, for general proficiency in Medical Study; the Treasurer's Gold Medal in Medicine; the Treasurer's Gold Medal in Surgery; the Gurney Hoare Prize of £25 for Clinical Study; the Beaney Prize of 30 guineas for Pathology; the Sands Cox Scholarship of £15 per annum for three years for Physiology; the Joseph Hoare Prizes of £25 and £10; the Michael Harris Prize of £10 for Anatomy; the Mackenzie Bacon Prize of £10 for Ophthalmoscopy; the Mackenzie Bacon Prize for Nervous Diseases of £15; the Burdett Prize for Hygiene, value £10.

For Prospectus and further information apply to the Dean, Dr. F. Taylor.

Guy's Hospital, S.E., London, July, 1884.

St. Thomas's Hospital Medical School,

ALBERT EMBANKMENT, LONDON, S.E.

The WINTER SESSION of 1884-5 will commence on OCTOBER 1st, when an Introductory Address will be delivered by Sir J. Risdon Bennett, M.D., F.R.S., at 3 p.m.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

The School re-opened on Tuesday, September 2nd, at Ten o'clock, and the usual Lectures commenced on Wednesday, September 3rd. Students who intend joining the classes are particularly requested to give immediate notice, the number of entries being already unusually great. Fees for attendance to the October examination, £6 6s.; for attendance to the December examination, £10 10s.; or for the entire session, £21.

For Prospectus apply to

Messrs. LUFF & WOODLAND.

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PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(*From the Royal School of Mines*),

6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.

STUDENTS REASSEMBLED SEPTEMBER 3rd.

Notwithstanding the great mortality at the June and July Minors, over seventy-five per cent. of my students were successful at the two combined. Individual personal instruction, as usual. No demonstrators. All students work *separately*, therefore entry may be made at and for any length of time. Postal teaching for Preliminary and Minor a speciality; books unnecessary, notes sufficient. Send stamp for terms, &c.

LABORATORY CLOSE TO GOWER STREET STATION.

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IN

Chemistry, Botany and Materia Medica

ARE CONDUCTED AT

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For particulars apply to Dr. DRINKWATER, 41, Chambers Street, Edinburgh.

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SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

FIFTEENTH SESSION, 1884-5.

Entries now being made for the new term.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

London Homœopathic Hospital

MEDICAL SCHOOL, Gt. Ormond Street, Bloomsbury, W.C.

The WINTER SESSION will open on Thursday, October 2nd, with the Hahnemann Lecture, to be delivered by Alfred C. Pope, M.D.

The work of the Session will include Lectures on the Practice of Homœopathic Medicine, by Dr. Dyce Brown, M.D., and on Materia Medica by a Lecturer who will shortly be appointed.

Clinical Lectures will be given by members of the Hospital Staff in the Wards, and the Practice in the Wards and the Out-patients' Rooms will be open to Medical Men and Students of Medicine.

For particulars regarding Lectures and Hospital attendance apply, by letter, to the Honorary Secretary, C. L. Tuckey, M.D., at the Hospital.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, Gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium, 100 Plants, 5s.

Faculty of Physicians and Surgeons
OF GLASGOW.

PRELIMINARY EXAMINATION.

The following are the dates at which the Preliminary Examinations will commence in 1884-5:—17th October, 1884; 26th March, 25th June, and 8th October, 1885.

Copies of the regulations, giving lists of subjects and other information, may be had on application.

ALEXANDER DUNCAN, B.A.,
September, 1884. Faculty Hall, Glasgow.

ENGAGEMENTS WANTED.

AS JUNIOR, in good house, City or West-end. Age 21. First-class references. Dispensing department preferred. W. R., 186, Richmond Rd., Hackney.

TRAVELLER.—A gentleman who is thoroughly acquainted with the details of a Wholesale Druggist's Sundriesman, Surgical Appliances, Dental Instruments, Chemists' and Surgeons' Requirements, wishes to represent a respectable house on journey. Good address, business ability and well received by all classes of customers. Worked South Coast. M., Messrs. Evans & Co., Hanover St., Liverpool.

IN Edinburgh.—By a medical student, with 3 years' experience, Evening employment in return for board and lodging, or small salary. ALPHA, J. Pumphrey & Son, Chemists, Evesham, Worcestershire.

AS ASSISTANT. 12 years' experience, town and country. Age 27. Height 5ft. 9in. Excellent references. Has been Manager. Out-door not objected to. QUERCUS, 15, Burton Cres., W.C.

AS JUNIOR, where two or more are kept. 4 years' experience. Height 5ft. 10in. W. FAULKNER, 83, Northgate, Newark, Notts.

AS IMPROVER, by youth (18). Good references. Has passed Preliminary exam. In the North or Midland counties preferred. E. HUGHES, Cross St., Holywell, N. Wales.

A GENTLEMAN, married, qualified, 16 years' experience, accurate Dispenser, good Prescriber, Dentist and Salesman, requires MANAGEMENT of Branch. Highly recommended. CHEMICUS, 15, Litherland Rd., Bootle, Liverpool.

AS MANAGER, in good firm or branch. Has had great experience in town and country. Age 40. Height 6ft. Best references. JACKSON, Heathfield, Stamford Heath, Chester.

LOCUM TENENS. Day, week or month. Town and country experience. Minor qualification. Disengaged September 20th. Good references and moderate terms. A. P. S., 34, Bridge St., Cambridge.

AS ASSISTANT or MANAGER. 10 years' experience. Minor and Apothecaries' Hall qualifications. Out-door preferred. Good references. WEBSTER, Podophyllin House, 7, Upper St. Martin's Lane, W.C.

AS ASSISTANT or DISPENSER. 4½ years as Senior Dispenser in last situation. Height 6ft. Age 28. AMICUS, 11, High St., Woburn, Beds.

AS JUNIOR or IMPROVER, in a good house of business, where two or more Assistants are kept. 2½ years' experience. Aged 18. Passed Preliminary. Midlands preferred. W. H., Kettering.

ENGAGEMENTS WANTED.

AS MANAGER or SENIOR. Permanency preferred. Good experience. Qualified. Highest testimonials and references. B. M., 16, Charles St., Preston.

AS JUNIOR, with half-time to attend lectures. Age 22. T. P. S., 140, Hartfield Rd., New Wimbledon.

WHOLESALE.—In any department. Would not object to travel. 5½ years' Retail experience. H. HILL, 2, West Park Ter., Anlaby Rd., Hull.

TO APPRENTICE a well educated and gentlemanly youth to a Chemist and Druggist, in a first-class business. He leaves school in October. Moderate premium. E. A. B., Marnwood, Iron Bridge, Shropshire.

AS Junior ASSISTANT in a good class Dispensing business for 12 months or so. Accustomed to good class Mixed country business. In-doors. Salary £25. State hours, &c., to HAYTON & MAWSON, Wholesale Druggists, 99, Gilesgate, Durham.

IN a good class business. Several years' experience in leading houses in London, the provinces, and on the continent. Minor qualification. Age 27. COSMO, 24, Segontium Ter., Carnarvon.

AS ASSISTANT in a country business. Out-door. Age 24. Height 5ft. 10in. 8½ years' experience. Good references. J. E. ROWELL, Barrs St., Whittlesea, Peterboro'.

AS JUNIOR in West of London. Accustomed to good class business. Age 19½. Passed Preliminary. Now disengaged. R. BAUGH, 26, Wellington Ter., Carnarvon, North Wales.

AS JUNIOR.—Preferably Midland counties, and where more than one are kept. Age 19. 3 years' experience in first-class Dispensing and Retail. G. B. GRIFFITHS, 11a, Promenade Villas, Cheltenham.

AS JUNIOR. 5 years first-class experience. Passed Prelim. and Apothecaries' Hall. Excellent references. J. G. W., 19, Tetlow St., Liverpool, N.

LOCUM TENENS, or to MANAGE Branch.—Town or country. 5 years' Liverpool and 9 years' West-end experience. First-class references. CHEMICUS, 150, Tottenham Court Rd., London, W.

ASSISTANT.—Town or country. Age 25. Good Dispensing experience. Apothecaries' Hall qualification. CHEMICUS, 4, Tyndale Ter., Canonbury Sq., Lohdon, N.

AS JUNIOR, in London. Salary not so much an object as time for study. Age 20½. Nearly 6 years' experience. J. M. BEANLAND, 40, Low St., Keighley, Yorks.

AS ASSISTANT or Branch MANAGER, in good class business. Age 28. Married. Minor. 13 years' varied experience. Out-door. CHEMIST, Mr. Ramsden, Jeweller, Southgate, Wakefield.

DISENGAGED. As ASSISTANT. Age 35. Varied town and country experience. Well up in Prescribing, &c. Abstainer. CHEMIST, 192, Bow Rd., London, E.

AS JUNIOR in Dispensing and Retail where 2 Assistants are kept. Age over 20. 6 years' country experience. G. A. B., Mr. Sumners, Pharmaceutical Chemist, Heckington, Linc.

ASSISTANT in good class business where more than one are kept. Minor. 8 years' experience. Age 24. Height 5ft. 9in. Good references. C. W., 11, York Buildings, Hastings.

AS IMPROVER, in-door, in Allopathic pharmacy, by a youth aged 17, who has had 18 months' experience in a Homœopathic pharmacy. Salary not so much an object as opportunity for gaining experience. SPES, care of F. Newbery & Sons, 1, King Edward St., Newgate St., London.

ASSISTANT, in or near London (West), in a good Dispensing business, with time for study. Age 26. R. T., 27, Dorchester Pl., Blandford Sq., N.W.

ENGAGEMENTS WANTED.

AS Locum Tenens or Manager, by a Pharm. Chemist, with first-class experience and highest references. Disengaged on the 14th inst. Beta, Mr. Burke, William St., Windsor.

AS Junior or Improver, in London or suburbs, where a knowledge of dispensing might be acquired. Age 19. Disengaged October 16. Williams, Chalmers & Son, Newport, Salop.

EDINBURGH or London. Advertiser, reading for Minor, seeks part-time engagement. Age 23. Tall. Good experience and references. Outon, Mr. Robertson, 52, Blenheim St., Newcastle-on-Tyne.

ADVERTISER, having served two years and a half in a surgery, wishes to serve another year with a good Retail Chemist. Age 20. Passed Medical Preliminary. London preferred. J. Edwards, Post Office, Carnarvon.

AS Dispenser to a Surgeon or Chemist. 5 years' reference from last situation. Other good references if required. George Brett, 40, Gospelgate, Louth, Lincs.

AS Assistant. 6 years' experience (London and provincial), chiefly Dispensing. Minor qualification. Good reference. Age 24. H. T. P., 10, Orbel St., Surrey Lane, Battersea.

AS Dispensary Porter and Assistant Dispenser.—A young man, age 27, has had 6 years' experience in a Hospital in a similar capacity. Can produce first-class testimonials. A. H. R., 30, Beak St., W.

AS Apprentice, in a Dispensing business. Passed Preliminary. Age 16. Premium if required. W., 3, Clarence Pl., York.

BY a Pharmaceutical Chemist, with first-class town experience, as Assistant. Age 24. C. G. C., 19, Pepper St., Chester.

AS Manager or Senior, by a thoroughly competent man. 18 years' experience. Age 34. Excellent references. A. J. Stratford, Wolvey, near Hinckley.

AS Improver, by a young man, of 2 years' experience. Age 17. Apply, with full particulars, to E. J. Davies, 14, High Ter., New Quay, Cardiganshire.

AS Junior (out-doors), in a brisk ready-money Retail business. Has had varied experience, and would accept a part day engagement. Excellent references. Smilax, 9, Nunhead Grove, S.E.

OUT-DOOR Assistant, or Manager of Branch.—Accustomed to first-class Dispensing and general Retail. 12 years' experience. Good references. Married, no family. Chemicus, Brook House, New Town, Ledbury.

AS Senior or Branch Manager in good Dispensing business. Minor qualification. Height 5ft. 7½in. Age 27. Married. Highest references. R. K., Mr. Hornby, Chemist, Darwen.

AS Junior. London preferred. Age 21. Disengaged October 27. Geo. J. Coombs, 73, Newborough St., Scarborough.

BY end of month, as Assistant in good class business. Time for study and to attend 3 evening lectures per week. Salary no object. A. B., 60, Lauriston Rd., Hackney.

AS Junior in a good Dispensing business in London, with time for study. West-end preferred. Height 5ft. 9in. Age 21. 4½ years' experience. Cortex, 67, Queen's Rd., Bayswater, W.

AS Junior. Age 19. Height 5ft. 11in. 4 years' experience. Disengaged October 14th. A. E. Fuller, Chislehurst West, Kent.

TRAVELLER, representing an old established drug house in the North, will be at liberty shortly to cover the same ground for a good firm. Some years' introduction to Surgeons. North, 16, Devonshire Rd., Hackney.

ENGAGEMENTS WANTED.

AS Assistant or Manager. 12 years' experience in good businesses. Satisfactory references. Out-door preferred. Disengaged. W., 9, Mimosa St., Fulham, S.W.

AS Manager, or position of trust. Many years' high class West-end experience. Speaks French. Disengaged. A. B., 15, Hereford Rd., Bayswater, W.

TILL end of October. As Assistant in first class Dispensing business. Apply, by letter, B., 59, Davies St., Berkeley Sq., W.

DISPENSER to a Surgeon or Chemist. 6 month's experience. Good reference. Age 19. W. J., St. David's Villa, Llandyssil, South Wales.

AS Assistant, in good general business. Qualified. Age 26. Varied experience and good references. Out-door preferred, but not essential. X., 7, Gatefield St., Crewe.

AS Assistant, in-doors. Aged 23. Height 6ft. 7 years' experience. Town and country. Accurate Dispenser. Chemicus, The Laurels, Chobham, Woking, Surrey.

ASSISTANTS WANTED.

JUNIOR for a Dispensing and Mixed country business. No paints or very heavy trade. No Sunday duty. Apply, stating age, height, salary required, references, &c., to E. Youngman, Pharmaceutical Chemist, Bury St. Edmund's. Photograph to be enclosed if possible.

A RELIABLE Assistant, for Mixed country business, with Dispensing, Counter Prescribing, &c. State full particulars, with references, photo. if convenient, to Randal How, Chemist and Dentist, Oxford.

PARIS.—A Dispensing Assistant, speaking French. Must possess good references as to ability and character. Exceptional situation for suitable young man. Apply, 1, Southwick St., W., where all particulars can be obtained.

JUNIOR Assistant, at once, to manage branch. Suit one reading for exam. Must be well recommended. Apply, with usual particulars, W. A. McKown, The Medical Hall, Douglas, Isle of Man.

MR. TOMLINSON requires, on October 3rd, a second Assistant (3 employed), principally for Dispensing. Minor qualification. In-doors. Personal application if possible; if by letter, state salary required and all particulars, and enclose carte, to be returned, 2, Lower Seymour St., Portman Sq., London, W.

IN a first-class Dispensing business, in a fashionable town, a good Assistant as Dispenser. Must have been accustomed to good class Dispensing and be well recommended. Reply, stating age, height, salary required, and experience, to W. K., care of Hearon, Squire & Francis, 5, Coleman St., London.

A STEADY, respectable young man, for a light Retail and Prescribing business. Age from 20 to 23. Two hours daily allowed for study. One only kept. Personal interview necessary before engagement. Apply to F. W. Sandy, 390, Walworth Rd., S.E.

JUNIOR Assistant, of good address, accustomed to a quick Counter Retail and Dispensing business. Age about 20. Apply, stating height, age, salary, &c., enclosing carte de visite (returned), to W. Boor, Chemist, Wisbech.

R. JEFFREY & SON, Pittville, Cheltenham, have a vacancy for an Assistant. One only kept. Abstainer preferred. In applying please state usual particulars and salary required.

AT once.—An Assistant, under 30, to manage a Branch. One accustomed to Mixed trade. Apply, with full particulars, to S. P. Bostock, Chemist, Hyde.

ASSISTANTS WANTED.

IN October. A Junior ASSISTANT, accustomed to Retail, Prescribing, and Tooth Extracting. One having some knowledge of Mechanical Dentistry preferred. Apply, stating age, height, salary required, &c., H. KNIGHT, 103, High St., Wandsworth, S.W.

IMMEDIATELY.—A Junior ASSISTANT of gentlemanly appearance and address, accustomed to a good class Retail and Dispensing business. Apply, stating age, experience, salary required, and full particulars (enclosing carte, if possible), to Mr. WILLIAM HIGGINS, 49, The Borough, Farnham, Surrey.

A FIRM of Manufacturing Chemists require an ASSISTANT at the Wet Counter. One with experience in a Wholesale Druggists preferred. Apply by letter only, stating age, where last employed, and salary required, to STATIM, care of Messrs. Donnison & Son, 20, Wormwood St., E.C.

APPRENTICE.—A vacancy for a well educated youth as Apprentice in a good Dispensing business. A comfortable home and every opportunity for thorough knowledge of the business. Moderate premium. Apply to W. PITCHFORD, 54, Cotham Hill, Cotham, Bristol.

JUNIOR or IMPROVER required. Ample time for reading. Apply, personally, to J. D. MILLER, 1, St. Ann's Rd., Royal Cres., Notting Hill, W.

A PUSHING energetic young man as TRAVELLER. Part salary and commission. Must be a good Salesman and of good address. Apply, with photo and references, to HAYTON & MAWSON, Wholesale Druggists, 99, Gilesgate, Durham.

IMMEDIATELY.—A second ASSISTANT, for good Family and Dispensing business. Salary £40, in-doors. References as to qualification and character must be good. Apply, with all particulars and carte, to G. SPEECHLY, Bishop Stortford.

AN active JUNIOR. Out-door. One accustomed to a general country trade. Reference must be unexceptionable. Apply, stating age, height, and salary required, to Mr. C. WILKS, 191, High St., Lincoln.

IMMEDIATELY.—A competent ASSISTANT, not under 23 years of age. Must be a good Dispenser. Apply, stating salary required, previous experience and references, to T. BLACKSHAW, Market Pl,, Burslem.

BRIGHTON.—An ASSISTANT, for a first-class Dispensing business. Apply, stating when disengaged, age, height, salary and reference, to KILBY PEARS, 16, Western Rd., Brunswick Sq., Brighton.

BY a gentleman having several branch establishments, a competent and qualified man, about 40, to keep stock, books, &c., and assist in general management. A suitable man will be liberally dealt with, and none other need apply. Also an ASSISTANT to Manage a Branch. Between 25 and 30. In or out-door. References must bear strict scrutiny. Address, with photo, to R. S., Evans, Sons & Co., 56, Hanover St., Liverpool.

AN ASSISTANT, age about 25 years, for a Mixe Abusiness, by the end of September. Out-door. pply, SCAWIN & BURN, Market Pl., Durham.

AN ASSISTANT, about 23 years of age, accustomed to good Dispensing and Retail trade. Apply, with full particulars, enclosing photo., if convenient, to H. MEADOWS, Pharmaceutical Chemist, Gloucester.

MANAGER, by September 26th. Must be active and obliging, well up in Prescribing and Dispensing. Qualified. Highest references required. Age between 30 and 40. In-doors. Single. Apply to the MANAGER, 96, Marchmont St., Russell Sq., London.

IMMEDIATELY.—A competent ASSISTANT, of good address, for about 3 months. Good Dispenser. Out-door. Apply to S. B. HARDCASTLE, 71, East St., Brighton.

ASSISTANTS WANTED.

A COMPETENT ASSISTANT, out-door, early in October, accustomed to good class Retail and Dispensing. Not under 22 years of age. No Sunday duties. Apply, stating age, salary required, references, &c., to J. J. GILES, Chemist, Folkestone. Applications not answered in 3 days may be considered declined.

IMMEDIATELY.—An in-door ASSISTANT, of good address. Qualifications not necessary. Age about 20 to 25. Apply, personally (any time), at W. LANE, Chemist, 388, Holloway Rd., N.

QUALIFIED Senior ASSISTANT. In-door. Of good abilities and address. For a competitive business. Send full particulars and references, to MORRIS BANKS & Co., Birmingham.

IMMEDIATELY.—A Junior ASSISTANT. Must have good references. One from the country not objected to. Apply, personally or by letter, giving full particulars as to experience, salary required, &c., to R. FREEMAN, Chemist, Post Office, 58, Broad Green, Croydon.

A JUNIOR ASSISTANT, in-door, for a Dispensing and light Retail business. Apply, stating age, height, salary required, reference, when disengaged, &c., &c., to F. SUSSUM, 6, Market Pl., Cambridge. Photograph to be enclosed if possible. Churchman preferred.

A COMPETENT ASSISTANT. Must be accustomed to a country trade and understand Welsh. An eligible and permanent situation for a suitable person. Address, A. B. C., to the care of Messrs. Evans, Sons & Co., Hanover St., Liverpool.

A COMPETENT ASSISTANT, about 25, with Minor qualification, and accustomed to a good-class business. A good Prescriber and Tooth Extractor preferred. W. S., care of Messrs. Edwards & Son, Queen Victoria St., London, E.C.

A JUNIOR ASSISTANT, accustomed to a good class country business. Apply, with full particulars, stating height, salary and references, to W. ROWLAND, Chemist, Wrexham.

AN ASSISTANT, with Minor qualification, who has been accustomed to good class Retail and Dispensing. Send full particulars, with carte, to GEO. GOODLIFFE, Pharm. Chemist, Folkestone.

IMMEDIATELY.—A thoroughly trustworthy ASSISTANT, to manage a Retail and Prescribing business, and Extract Teeth. Total abstainer preferred. Also a good JUNIOR. State age, height, experience and salary required. Out-door. Apply, CHEMIST, 39, Redcliff Hill, Bristol.

IMMEDIATELY.—A competent ASSISTANT, about 25. Accustomed to a good Dispensing business. State full particulars to W. W. BRUNTON, 160, Earl's Court Rd., Kensington.

IMMEDIATELY.—A young man, who has passed Preliminary, about 18 to 19 years of age, as JUNIOR or IMPROVER, who is seeking a permanency. Must have good reference. Apply, personally, W. M. COVELL, 302, Mare St., Hackney, London, E.

A COMPETENT JUNIOR, to manage a Surgeon's Retail. Apply (if personally, before 11 or after 6) to the SURGEON, 513, Hackney Rd., London.

AN ASSISTANT, about 22 years of age, accustomed to a good class light Retail. Must be an accurate Dispenser. Apply, stating height, age, salary, with reference, and carte de visite (to be returned), to T. E. MILLIDGE, 124, High St., Tonbridge.

APPRENTICE.—The Trustees of the late E. RAINEY, Pharmaceutical Chemist, Spilsby, have a vacancy for a well educated youth. Every facility afforded for thoroughly learning the business, combined with a comfortable home.

ASSISTANTS WANTED.

ABOUT October 1. An in-door Junior ASSISTANT to make himself generally useful. Call or apply, with particulars, salary, &c., to P. COOKE, Chymist, Church Row, Wandsworth.

OUT-DOOR ASSISTANT. Duties chiefly Wholesale. Will be required to travel about 3 days per week. Apply, stating experience, references, age, &c. (enclosing carte), to P. Y., Messrs. Wright, Layman & Umney, Southwark St., E.C.

TWO active COUNTERMEN for a West End Establishment. Apply to F. F., 7, Howick Pl., Victoria St., S.W.

IMMEDIATELY.—An ASSISTANT, not under 23 years of age, for a good Dispensing business. Only one kept. Salary £40. In-door. Apply, stating age and reference from last employer, to J. P. MELLIN, Dispensing Chemist, Wimbledon.

APPRENTICE.—A Pharmaceutical Chemist requires a gentlemanly youth in an old established Family and Dispensing business, 16 miles from London. Pleasant healthy neighbourhood. Comfortable home. Time given for study. Premium required. Apply, by letter, to A. Z., Messrs. Sutton & Co., Bow Churchyard, Cheapside.

MESSRS. ARGLES & STONHAM, Maidstone, have a vacancy for a Junior ASSISTANT. Work principally in the Wholesale. Apply by letter, stating age, qualification, and salary required.

BUSINESSES FOR DISPOSAL.

BRIGHTON.—On account of owner retiring. A genteel Family and Dispensing BUSINESS, situate in the best leading thoroughfare. Established 31 years. A thorough genuine concern and cheap. Price £250. Rent exceedingly low, only £70. 11 rooms besides shop. Apply to Messrs. AKEHURST & SON, Prince Albert St., Brighton.

IMPORTANT to Dispensing or Photographic Chemists.—Owing to the sudden illness of proprietor. The old established BUSINESS of a Chemist and Druggist, in a rising town in the Midlands. Must be disposed of immediately. There is attached to it a profitable Photographic and Optical business, and has been established 40 years. Full prices obtained for Patents, &c. Club Dispensing, and several promising Specialities. Apply to J. WINGRAVE, Allington Villa, Coventry; or to A. WINGRAVE, 10, Pall Mall, S.W.

CHEMIST and Dentist.—Rent only £28. Returning between £8 and £9 weekly. Will bear strictest investigation. Good profits. Large and growing neighbourhood. Handsome shop. Convenient premises. Intending purchaser need not apply unless he is prepared to put down £100; remainder by instalments if preferred. Apply, ALPHA, care of Mr. Lungley, Bookseller, Plaistow, Essex.

IMMEDIATELY.—Through continued ill-health. In a select and fast increasing country town. A first-class Dispensing, Prescribing, and general RETAIL. Very profitable. Shop (double-front) well fitted and stocked. A thoroughly reliable busines. Capable of great increase. Some excellent Proprietary Medicines. An immediate purchaser liberally treated. Good opening for Dentistry. Address, CHEMICUS, care of Messrs. Southall Bros. & Barclay, Manufacturing Chemists, Birmingham.

MESSRS. HINE GILBERT have for transfer:—Very handsome and profitable suburban Pharmacy. Doing increasing trade. For £500. Also select trade of £3000 per annum on easy terms. NEAR LONDON. Well-fitted shop and convenient house. Trade let down. Cash, £120. Apply, 17, Hart St., Bloomsbury Sq., W.C.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for transfer:—SUFFOLK. Unopposed Retail and Prescribing business. Same family 40 years. 10-roomed house, quarter of an acre garden. Rent £30. Returns £500. Net profit £250. For £350. NORFOLK. Old-established Retail Prescribing trade. Returning £1200. For £900. WORCESTER. Retail and Dispensing, and Mineral Water trade. Returns £2300. Same hands 20 years. For £1450. STAFFORD. Death vacancy. Retail, Prescribing and general Mixed trade. Returning £3000. Has done £5000. For £500 and valuation. ESSEX. 20 miles out. Retail and Prescribing trade. Returning £550. Same hands 30 years. Retiring. £450. LONDON, W. Thoroughly genuine Retail and Dispensing. Showing £300 net profit. For £500. S.W. Handsome corner. Elegantly fitted. Returning £650. For £450. S.E. (suburb). Thoroughly genuine Retail and Prescribing. Showing £600 net profit. Trial allowed. £1100. N. Old-established corner. Well fitted. Shows £300 net profit. Good house and garden. £700. N.E. Corner Retail and Prescribing trade. Returning £7 weekly. For £225. Please apply, 30, Jewry St., Aldgate, City.

UNOPPOSED Village TRADE, in South Staffordshire. Pleasantly situated in rural district. Large population; numerous resident gentry. Established 30 years. Convenient house and shop, with plate-glass double-front. Returns over £600 per annum, at full prices. Apply, F. W., care of Wyleys & Co., Coventry.

NORTHAMPTONSHIRE.—For immediate disposal. A genuine BUSINESS, in a prosperous village, with a population of over 4000; most of whom find steady employment at their own homes and factories, in producing a staple in constant demand. Has also a good connection in Cattle Food, Sheep Dipping. Situate in a first-rate agricultural district. No other chemist within 5 miles. Modern stone-built house, with coach-house, garden, &c. Shop well fitted. Returns over £500 per annum. Capable of great extension by a pushing man. Rent £40. 9 years' lease. Price £350. Personal inspection invited. Apply, X. F., care of Wyleys & Co., Wholesale Druggists, Coventry.

EXCEPTIONAL opportunity to an energetic man, with limited capital. Cash BUSINESS. Full prices. Population 2000. No other chemist. New Dock now completed (cost £250,000), close to premises. Sole reason for disposal, owner's entire inability to give any supervision whatever to it. Apply, Mr. PROCTER, Chemist, Penarth, Glamorganshire.

SMALL, but rapidly increasing, BUSINESS, situated in improving Northern suburb. Shop well fitted and stocked. Occupies a commanding position. Price for goodwill, stock, fixtures, and fittings, £200. CHEMIST, Central News Rooms, Ludgate Circus, E.C.

IN a leading thoroughfare and good neighbourhood.—A respectable BUSINESS, in a favourite suburb of Liverpool. A commanding corner shop, with plate-glass windows and mahogany fittings. The house is large, with 2 parlours on the first floor, and private entrance. Admirably suited for a Chemist and Dentist. Death of proprietor cause of sale. Apply to Mr. EDISBURY, 27, Soho St., Liverpool.

A GENUINE Retail and Prescribing BUSINESS, in S.W. district. No opposition. Thickly populated neighbourhood. Satisfactory reasons for selling. Address, M. B., 138, New Rd., Battersea, S.W.

WANTED TO PURCHASE.

A SMALL BUSINESS. Capable of extension. Convenient house and garden. In pleasant suburb within 20 miles of town. W., S., or S.E. locality preferred. Address, Z., care of Miss Turner, 18, Tullington Rd., Anerley.

FOR SALE.

A SPLENDID pair Specie Jars, on ebonised and gilt stands, extreme heighth 36 inches; other sizes in stock; 2 pair swan neck Carboys and stands; a quantity of large pear-shape ditto; Shop Rounds, blue and white Ointment Jars and Pots, Jujube Jars, and other fancy jars; 24-3, 4, and 5 grain Pill Machines, equal to new; Wall Case, as Maw's fig. A 88; a 12ft. Wall Case; small Dental Case, with specimens; outside Globe Lamp; Sponge Cases, A 41, A 42; a 12ft. Fixture, as Maw's fig. A 84; 2ft. long, 4ft. long, 6ft. long, 8ft. long, 12ft. long mahogany fronted Drawers, glass knobs, glass labels (bevelled edge), with lockers for bottles under, 4ft. high. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

DISPENSING Screen, 5ft. 6in., with counter under, fitted with drawers and plate glass cases in front, a bargain; Dispensing Screens, 5ft., 6ft., 7ft., glass case at each side, with silvered plate-glass centre, with marble slab in front, with carved wood on top, 3ft. high, the cases at each side have plate-glass doors, with tablets on top, 2ft. high, inside each case fitted with silvered glass and shifting shelves; as fig A 53, 5ft. 6in. long, 7ft. 6in. long; as fig. A 54, 4ft. long; as fig. A 55, 5ft., 6ft., 7ft. 6in. long; Sponge Case, A 43; a Centre Case, 8ft. long, 5ft. wide, mahogany; a number of other size Screens and Cases, very cheap. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

FOR Sale. Plate-glass Counter Cases, as fig. A 2, 3ft. long, 4ft. long, 4ft. 6in. long; as fig. A 3, 3ft. long, 3ft. 6in. long; A 6, 4ft. long, 5ft. long, 6ft. long; as fig. A 7, 3ft. 6in. long, 6ft. long; as fig A 8, 5ft. long, 6ft. long; as fig. A 9; as fig. A 13, 4ft. long, 4ft. 6in. long; A 5, 6ft. 6in. long; A 16, 3ft., 3ft. 6in., 4ft. long; A 17, 4ft. long, 4ft. 6in. long; A 18, 5ft. long, 6ft. long, 7ft. 6in. long, 8ft. long, 9ft. long; Tooth Brush Case, A 9, A 10; Desk and Cases, as fig. A 30, 2ft. 6in. long, and 3ft. long, as fig A 31; Cigar Cases, A 34. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

MAHOGANY top Counters, fitted with drawers, 5ft., 6ft., 7ft., 8ft., 14ft., 18ft., and 20ft. long; 12ft. mahogany fronted Counter; 6ft. mahogany fronted Counter; 13ft. 6in. mahogany and plate-glass fronted Counter; 7ft. do., do.; a 16ft. long, 3ft. wide, Side Counter, fitted with drawers; a large quantity of second hand solid oak Drawers, in splendid condition, very cheap; a quantity of Shelving, Cupboard Doors, &c. E. NATALI, 207, Old Street, near Pitfield St., London, E.C.

Important to Chemists Fitting Up or Making Alterations.

ONE range of 66 new mahogany-fronted Drawers, 12ft. long, with glass labels (bevelled) and glass knobs, price 178s. Shelving and Cornice over, 42s. One range do., 6ft. long, 33 drawers, 89s. One range do., 18ft. long, 99 drawers. The entire new Fittings of a shop, about 12 by 14ft., including 12ft. nest of Drawers, with gold labels and glass knobs, lockers under, and shelving and cornice over; Shelving and Cornice for back of shop; Counters, Dispensing Screen, Desk and Glass Case, bent front Case, Window Enclosure, Bottles, Jars, Globes, &c., for the very low sum of £40. A lot of new and second-hand Globes. Crystal glass Knobs, 21s. per gross. 6ft. pine Wall Case, 150s. 8ft., 200s. Second-hand Desks and Cases in front. Lists and estimates free. Workmen sent to all parts of the country. Address, R. TOMLINSON, 15, St. Paul's Square, Birmingham.

A CHEMIST going abroad to Australia, New Zealand, and returning viâ San Francisco and the American Continent, would be glad to take an agency to introduce a speciality. Has an intimate and practical knowledge of advertising and is prepared to give satisfactory references and money securities. Apply, PHARMACIST, 60, Bartholomew Close, London.

Messrs. TAYLOR & CO.

Chemists' Agents and Valuers,

WALBROOK CHAMBERS, 38, WALBROOK,

LONDON, E.C.

HAVE THE FOLLOWING BUSINESSES FOR DISPOSAL:—

1. NORTH OF ENGLAND (seaside).—Season now on. First-class Dispensing and light RETAIL. Now returning about £23 a week. Illness sole cause of sale. Price only £800. A bargain.
2. NOTTS.—Returns £1500. Price valuation of stock and fixtures.
3. BRISTOL.—Ready-money and very profitable BUSINESS. Returns about £500. Rent £40. Price £350.
4. EASTERN COUNTIES.—Old established BUSINESS. No heavy trade. Very profitable. Returns £600 to £700, and capable of great extension. Large house and garden. Rent £55, on lease. Price £500.
5. LONDON, S.W.—Good Family BUSINESS. Returns £15 a week. Rent low, on lease. Price £650.
6. LONDON, E.—Returns as a Branch £500. Price £300.
7. LONDON, W.—Main thoroughfare. Returns £530. Could easily be doubled. Rent £56, on lease. Price £450.
8. LONDON, S.W.—First-class Dispensing and PROPRIETARY ARTICLES. Returns about £1200, at good profits. Price £1250.
9. LONDON, N.W.—Returns £650. Price valuation of stock and fixtures only.

Also over 300 other businesses in town and country. Particulars on application.

NOTICE.

Now in press.—A printed Register, containing particulars of about 300 businesses. Can be had gratis on application. Early enquiries solicited for the same.

VIZER'S

CHEMISTS' TRANSFER and ASSISTANTS' REGISTRATION AGENCY,

Victoria Chambers, 55, Chancery Lane, London.

MR. EDWIN B. VIZER, Pharmaceutical Chemist, having been engaged in the business for the last 36 years, is prepared to offer special advantages to his clients.

The following businesses, among others from £100 upwards, for sale:—

SURREY.—A handsomely fitted PHARMACY. Large population. Returns £600. Price £550.

SURREY.—A Family Retail and DISPENSING. Good house and garden. Returns £240. Price £225.

KENT.—A recently opened BUSINESS. Owner unexpectedly called abroad. Price £300. Less than cost of fittings, &c.

NORFOLK.—An old established and sound country BUSINESS. Returns £1200. Price £900.

DURHAM Co.—A general RETAIL, with Dentistry. Returns £400. Price £300.

LONDON.—Several in various parts.

No charge to purchasers.

ASSISTANTS' REGISTRATION DEPARTMENT.

Employers and Assistants should send full particulars of requirements, with Registration Fee, 2/6, *Postal Order.*

Several vacancies for Juniors.

Office hours, 10 to 4; Saturdays, 10 to 2.

Midland Counties' Transfer Agency.

F. J. BRETT,

Trade Valuer and Auctioneer,

LEICESTER.

VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Purchasers have, at this agency, the advantage of about 300 Businesses to select from, requiring from £100 to £3000 capital.

Probate and Fire Insurance valuations.

JERSEY.—Dispensing and light RETAIL, returns £350, capable of increase, house large, two rooms let off more than covers rent, price £320.

NOTTINGHAM.—Branch RETAIL, returning £7 week, price £160.

SOUTH COAST.—Retail, Prescribing and DISPENSING, pleasant locality, returns over £400, and increasing, price £270.

SHEFFIELD.—Dispensing and light RETAIL, best position in town, handsomely fitted shop, returns now £900, and with more personal attention could be doubled, at valuation of stock and fixtures, about £1000.

HUDDERSFIELD.—Light RETAIL, in good position, returns £600, at valuation of fixtures and part stock, £250.

MIDLANDS.—In town of 10,000 inhabitants, an old established Family BUSINESS, with some local Wholesale, returns, Drugs £1800, with Mineral Water factory, returning £900, and could be doubled, satisfactory reasons for sale, full prices, price about £2000, or by goodwill and valuation.

LEICESTERSHIRE.—Light good class country RETAIL, good house and garden, rent £20, returns £450, price £275.

LANC.—Retail, Wholesale and good Proprietary TRADE, returns £1500, at valuation, £800.

ISLE OF WIGHT.—Profitable light Retail, Prescribing and DISPENSING, returns about £400, rent £26, garden, suit a young pushing man, price £200.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

HENRY GADD,

Member of the Pharmaceutical Society,

CHEMISTS' TRANSFER AGENT,

97, FORE STREET, EXETER.

H. G. will be happy to furnish intending purchasers with particulars of Businesses from his Register. He has several to offer in Town and Country, to suit large or small capitalists.

Applications for either the sale or purchase of Businesses inserted in Register free of charge.

IMPORTANT.—A lady wishes to dispose of (privately) her complete suite of Old English pattern Electro-plated Spoons and Forks. All are stamped A 1 quality. Never been used. The set comprises 1 doz. each Table and Dessert Forks, Dessert Spoons and Tea Spoons, ½-dozen Table Spoons, 4 Salt, 6 Egg and 2 Mustard Spoons, with gilt bowls, 66 pieces in all. To an immediate purchaser the low sum of 50s. will be accepted for the entire suite. A very great bargain. Mrs. MACGREGOR, care of Drallim & Oliver, 18, Ironmonger Lane, Cheapside, E.C., where the plate may be seen, or can be sent on approval.

CHEMISTS' TRANSFERS.

32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business, will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

MESSRS. ORRIDGE & CO. are instructed to transfer :—

1. LONDON, N.W.—Good class locality. Situated in main road. Retail, Dispensing and Prescribing BUSINESS. Returns £500 yearly ; increasing. Good house, easily let off if wished. Price about £500. Open to an offer.
2. LONDON.—Easy distance of the Bank of England. Very old established PHARMACY. Large foreign trade may be done. To a gentleman acquainted with German and French Pharmacy a good opportunity offers. Returns £600. Valuation will be accepted.
3. SURREY.—In a pretty locality. Good class Retail and DISPENSING. Returns nearly £700. Large double-fronted shop, very attractive, with handsome fittings and large stock. Large house and good garden. Vendor will give a good introduction. Price £625.
4. KENT (12 miles from London Bridge).—In a pretty locality. Good class Retail and DISPENSING. Returns at present £12 per week; increasing fast. Handsome shop. Large house, easily let off if wished. Price about £550.
5. YORKSHIRE.—Large town. Good class Dispensing and RETAIL. Returns £750. Handsomely fitted shop. Business increasing yearly. Vendor will give every opportunity for investigation. Price £725.
6. LIVERPOOL.—Vendor retiring. Two BUSINESSES for disposal. Very profitable. 1st. Returns over £900. Price £800. 2nd. Returns nearly £600. Price about £600. Or an offer will be entertained and equitable terms arranged with any one who purchases both businesses.
7. GLOUCESTERSHIRE.—Retail and Dispensing BUSINESS. Returns £550 yearly. Full prices. No Oils, Colours, Tobacco, or Mixed Trade. Good house. Rent £40. Valuation of stock and fixtures only required. No premium for goodwill.

Other businesses, town and country. Particulars free on application.

VALUATIONS.

Terms for valuation on application.

ORRIDGE & CO.

32, Ludgate Hill, E.C.

CONDY'S FLUID.—Imitations.

INJUNCTIONS.

In the High Court of Justice.

CONDY & MITCHELL, LIMITED, *v.* FLINDERS.

By Order of Vice-Chancellor Sir James Bacon, dated the 11th June, 1884, the Defendant was perpetually restrained from infringing the Plaintiffs' Trade Marks, and from selling any Disinfecting Fluid in wrappers with any imitation of the Plaintiffs' labels, and from selling any Disinfecting Fluid not being of the Plaintiffs' manufacture as or for the goods of the Plaintiffs by using upon the bottles containing such Disinfecting Fluid a label colourably differing from the Plaintiffs' label upon bottles in which their Disinfecting Fluid known as Condy's Fluid is sold.

J. SEYMOUR SALAMAN,
12, KING STREET, CHEAPSIDE.
Solicitor to the Trade Mark Protection Society.

In the High Court of Justice.

CONDY & MITCHELL, LIMITED, *v.* COLDWELL & CO.

I, **DAVID BRAINERD COLDWELL**, of Lavender Hill, Clapham Junction, in the County of Surrey, Chemist, having inadvertently and in ignorance of the legal rights of the above-named Plaintiffs placed upon bottles containing a disinfecting fluid prepared by me Labels which in colour and wording are similar to those in use by the above-named Plaintiffs on bottles containing "CONDY'S FLUID," hereby express my regret, and have consented to a perpetual Injunction being granted in the above Action with costs.

Dated this 24th day of July, 1884.

(Signed) DAVID B. COLDWELL,
Trading as COLDWELL & Co.

J. SEYMOUR SALAMAN,
Solicitor to the Trade Mark Protection Society.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 743.] SATURDAY, SEPTEMBER 20, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
The Homoquinine of Cuprea Bark. By B. H. Paul and A. J. Cownley	221
International Forestry Exhibition at Edinburgh (*continued*)	222
The Caucasian Petroleum Region	225
EDITORIAL ARTICLES AND NOTES:—	
Dr. Angus Smith on the Examination of Waters	227
Notes:—American Pharmaceutical Association—German Pharmaceutical Association—Ontario College of Pharmacy and English Diplomas—Pharmacy in New South Wales—Patent Medicines and Chemical Manufactures in Japan—Death of Mr. Bentham	228
PHARMACEUTICAL SOCIETY OF IRELAND:—	
Meeting of the Council	229
BRITISH PHARMACEUTICAL CONFERENCE:—	
Report on the Strength and Condition of Commercial Specimens of Hydrargyrum cum Creta, Pilula Hydrargyri and Unguentum Hydrargyri. By M. Dechan and T. Maben	230
On Iodine in Cod Liver Oil and other Marine Products. By E. C. C. Stanford	233
Proximate Analysis of the Rhizome of Alpinia Officinarum. By Dr. Thresh	234
Note on Sulphurated Lime. By T. S. Dymond	235
Report on Commercial Peruvian Balsam and the Methods for ascertaining its Purity. By P. MacEwan	236
PARLIAMENTARY AND LAW PROCEEDINGS:—	
Herbalists' "Saffron"	239
Poisoning by Carbolic Acid during Medical Treatment	239
OBITUARY	240
CORRESPONDENCE:—	
Quinidine in Cinchona Bark	240
Permanganate of Potash Pills	240
Answers to Correspondents	240

Pharmaceutical Society of Great Britain.

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, October 1st, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely.*

The Sessional Prizes and Certificates will be distributed at this Meeting. An Address to the Students will be delivered by

W. T. THISELTON DYER, C.M.G., M.A., F.R.S., F.L.S.,
Assistant Director of the Royal Gardens, Kew.

All Students and Friends, ladies as well as gentlemen, are invited to be present.

LIBRARY AND MUSEUM.

SPECIAL NOTICE.

The Library and Museum will not be open in the evening during September.

PRELIMINARY EXAMINATION.

This Examination will be held throughout Great Britain, at 11 a.m., on the second Tuesday in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Shefficld
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

NORTH BRITISH BRANCH.

The Society's Rooms at 119A, George Street, Edinburgh, are closed, and the new premises at 36, York Place, Edinburgh, will be opened on Wednesday, October 1st.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-THIRD SESSION, 1884—85.

CHEMISTRY AND PHARMACY..... Professor REDWOOD and Mr. DUNSTAN.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratories.

At 8 p.m. on Wednesday, October 1st, the School Prizes will be distributed and an Address to the Students will be delivered by W. T. THISELTON DYER, C.M.G., M.A., F.R.S., F.L.S., *Assistant Director of the Royal Gardens, Kew. All Students and Friends, ladies as well as gentlemen, are invited to be present.*

THE LECTURES ON
CHEMISTRY AND PHARMACY

Comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects are fully illustrated with experiments, diagrams and specimens, and examinations of the class are held on those subjects which have been previously treated of in the lectures.

Additional lectures upon Chemistry and Physics are also delivered by Mr. Dunstan during the course.

The class in Practical Dispensing and the Reading of Prescriptions is conducted by Mr. Joseph Ince, and meets twice a week at 5 p.m.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

Comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures are fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is expected that all pupils will attend these examinations.

INSTRUCTION IN
PRACTICAL CHEMISTRY

Is conducted in the Laboratories by the Professor and Demonstrators. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date.* A Junior course occupies about five months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and is dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He expects all pupils to attend these classes.

Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London, W.C.

☞ *Chemists who would keep abreast the times should be their own manufacturers. The best and* **Latest** *counter companion is*

500 PRACTICAL TRADE RECEIPTS FOR CHEMISTS AND DRUGGISTS.

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NEPENTHE.

FERRIS & CO. *v.* GOODMAN.

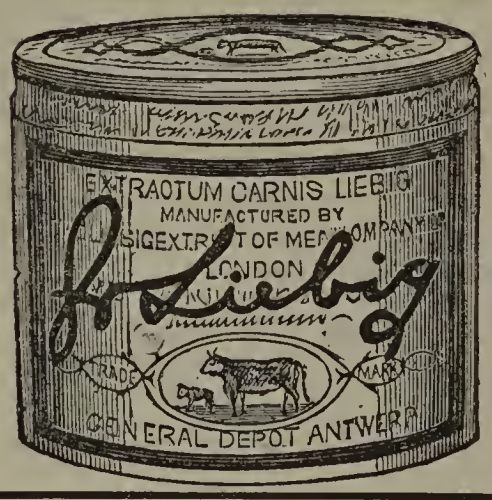
Notice is hereby given, that by an Order of the Chancery Division of the High Court of Justice, made the 18th day of July, 1884, in the above action, it was ordered that the Defendant and others be **perpetually restrained** from selling, or offering for sale, any formula or recipe for "**Nepenthe,**" and from otherwise prejudicing the sale thereof by, or injuring the title thereto, or Trade Mark therein, of the Plaintiffs, Messrs. FERRIS & Co., of Bristol, Wholesale Druggists, the **Registered Proprietors thereof.**

And it was further ordered that the Defendant do pay the costs of the said action.

Dated this 12th day of August, 1884.

(Signed) CHILTON & GREEN-ARMYTAGE, Bristol,
Solicitors for the said Plaintiffs.

LIEBIG COMPANY'S EXTRACT OF MEAT



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Plain Black Currant, old square ...	**2/6**	**2/8**
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Black Currant Voice (warm astringent)	**3/0**	**3/3**
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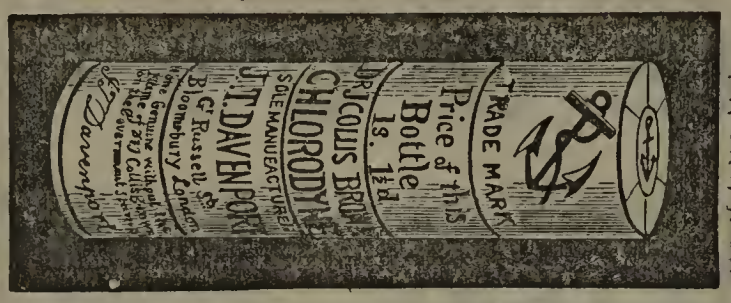

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DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false.*

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

DIARRHŒA, DYSENTERY. GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient. Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

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THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

Apothecaries' Hall	London.	Gale & Co.	London.	Morson, T., & Son,	London.
Allen, Hanbury & Co.	,,	Giles & Son,	Clifton.	Newbery & Sons,	,,
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Ferris & Co.	Bristol.	Marsden & Sons,	London.	Woolley, James,	Manchester.
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After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

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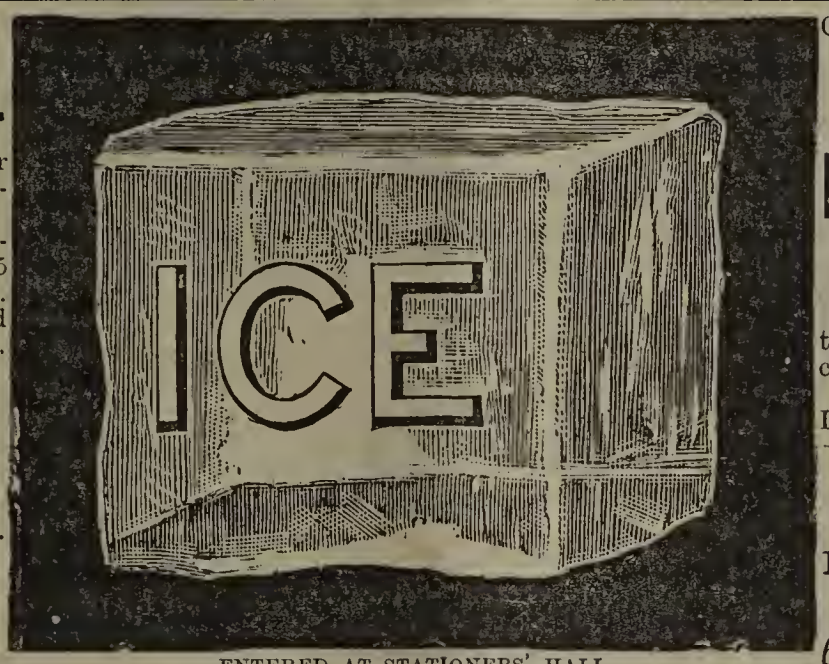

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Fig. 13.

Fig. 8.
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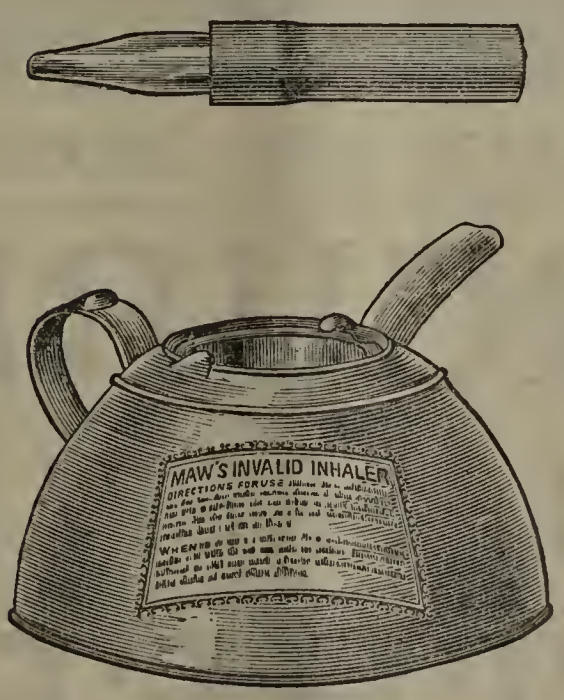

Fig. 100.
MAW'S INVALID.

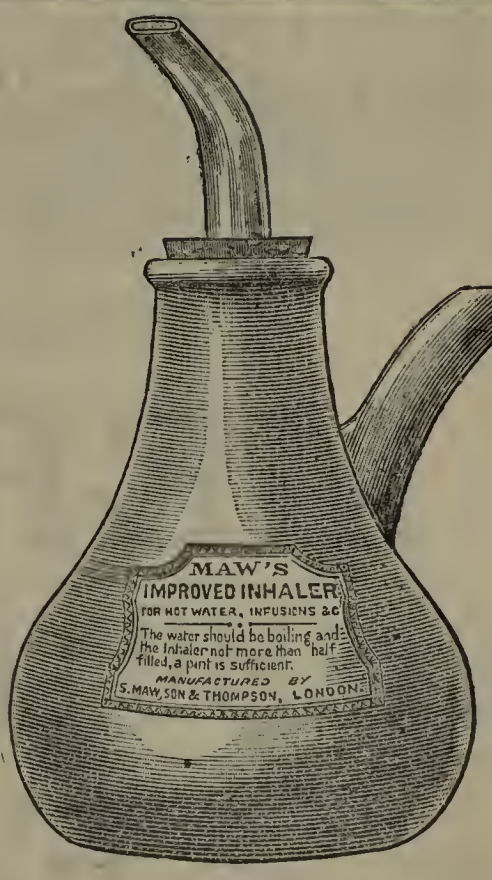

Fig. 8a.
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THE HOMOQUININE OF CUPREA BARK.

BY B. H. PAUL AND A. J. COWNLEY.

The very important contribution to the chemical history of the remarkable substance occurring in cuprea bark, which has been furnished by Dr. Hesse in the paper published in the *Annalen* for July last,* well entitles him to the gratitude of those who first recognized its individuality, and as among that number we desire to express our sense of obligation to him for the use he has made of his superior opportunities for investigating this subject. Certainly the substance in question is deserving of some consideration, for in addition to its own peculiarities, and the fact that it was independently and simultaneously discovered by four distinct sets of observers, it has been subjected more than the common run of "new bodies" to the struggle for existence which is perhaps the best test of fitness. In the first place Dr. Hesse is responsible perhaps for the non-publication of the observation made by his colleague Mr. Tod, in June, 1881, that cuprea bark contained a hitherto unknown alkaloid, and he was certainly disposed to doubt the distinct nature of the crystalline substance we obtained from that bark until we placed a small specimen of it in his hands for examination. Dr. Kerner and Dr. De Vrij pronounced the crystals of homoquinine sent to one of them by Mr. David Howard to be a mixture of quinine and cinchonidine, and lastly, Messrs. C. H. Wood and Barrett illustrated the dangers attending the use of the imagination in scientific matters by putting forward a suggestion implying that the substance, which indeed, Dr. Hesse infers, they do not seem ever to have seen, might be a compound of quinine with quinidine. Nevertheless, homoquinine has survived, though the difficulty of obtaining a supply of material for investigation has hitherto been a serious obstacle with those who would otherwise have studied it more completely.

Dr. Hesse has long since recognized the fact that cuprea bark contains a peculiar crystallizable alkaloid,† and he has now, in the most practical manner, made amends for his former disbelief by giving an elaborate history of this substance and its compounds, which places it beyond question. At the same time, however, we regret to find he has done this with some degree of hankering after the opinion he first expressed and that he suggests, as it were, as an apology for having confirmed the existence of homoquinine, the possibility of quinine becoming "modified" under certain conditions and then behaving as a distinct alkaloid.‡

We had long been aware that, in operating upon homoquinine with a view to its purification and the preparation of salts, there was sometimes an apparent disappearance of the substance, as it were under one's hands, in a way that was unaccountable, and that then the presence of quinine, or of an alkaloid resembling it in solubility in ether, could be recognized in the solutions; but we had always ascribed this latter circumstance to the admixture of quinine with our material and the small quantity of that at our disposal prevented the further settlement of this point. Another circumstance, which at first sight seems to lend considerable probability to Dr. Hesse's statement as to the convertibility of homoquinine into quinine, was the failure of all attempts to detect that substance in commercial quinine sulphate manufactured from cuprea bark. With a view to obtain a workable quantity of homoquinine we have repeatedly examined samples of quinine sulphate which we had every reason to believe had been derived from cuprea bark, and within the last few weeks have taken advantage of an opportunity to repeat the attempt with material of this description; but in every instance we have failed to obtain the faintest indication of the presence of homoquinine. But with every respect for the trustworthy nature of Dr. Hesse's observations, so far as they go, we must confess that our own experience in dealing with this remarkable substance made us hesitate before accepting unreservedly the statement that it is a modification of quinine and capable of being converted into quinine by the action of caustic soda. Upon receipt of Dr. Hesse's paper, therefore, we at once proceeded to follow out the treatment he describes for effecting the conversion of homoquinine into quinine. A quantity of the crystalline substance, obtained by treating the crude sulphate from cuprea bark with ammonia and ether, was first recrystallized several times from ether in order to separate any adherent quinine, and an acid solution of the purified substance was mixed with a 10 per cent. solution of caustic soda in excess and some ether. The alkaloid at first precipitated was completely dissolved on agitation, the ether solution, as well as the alkaline liquor becoming perfectly clear. After the lapse of several hours there was, however, no separation of crystals from the ether solution, as would have been the case with even a very dilute solution if ammonia had been used in place of caustic soda. Upon separating the ethereal liquor, neutralizing the alkaloid contained in it with sulphuric acid and evaporating, a crystalline sulphate was obtained, which when tested in the usual way with ether and ammonia behaved exactly like quinine sulphate, no vestige of homoquinine crystals being formed even after the lapse of several days. This result appeared to be exactly the same as that obtained by Dr. Hesse, except in one particular, viz., that it was not obtained by degrees, as Dr. Hesse's description would suggest, but at once and without any need for the "repeated precipitations" mentioned by Dr. Hesse. This discrepancy led us to repeat the experiment several times, invariably, however, with the same result, which seemed to be conclusively opposed to the doubt we entertained as to the conversion of homoquinine into quinine. But on further consideration of the matter and having, as is our general practice, regard to the quantitative relations of the experiment, we observed that the quantity of alkaloid permanently soluble in ether thus obtained was never more than about one half that of the homoquinine operated upon. The solubility of quinine in solution of caustic soda is too slight to account for this deficiency. Still we found that on adding to the caustic soda liquor with which the homoquinine had been treated in these experiments sufficient sulphuric acid to make it faintly acid, there was a copious precipitation of a crystalline sulphate, the quantity of which accounted for the deficiency above mentioned. The alkaloid contained in this salt was not quinine; it crystallized readily from solution in ether in rhombic plates, larger and more

* A translation of this paper appeared in the *Pharmaceutical Journal* for August 23, p. 141.

† *Berichte*, xvi., 60, and *Pharm. Journ.*, Feb. 1883, p. 685.

‡ See *ante*, p. 144.

massive than the ordinary crystals of homoquinine and otherwise presenting a character distinctly different from them. The alkaloid thus obtained was again treated with caustic soda solution and ether, but it gave no evidence of being thus convertible into quinine; the whole of it remained dissolved in the soda solution and was easily obtained again in the crystalline state by subsequent treatment in the ordinary way with ether and ammonia. Heating this base with caustic soda solution also failed to render it permanently soluble in ether or to affect its capability of crystallizing from ethereal solutions. On re-examination of the caustic soda liquors separated in the various repetitions of this experiment we found that after having been exposed some time and undergone evaporation they presented the appearance of a thick jelly, another point which marks the alkaloid soluble in caustic soda solution as peculiar and one hitherto unobserved.

At present we are not in a position, from dearth of material, to carry our examination of this subject further, but the results above described are, we think, sufficiently definite to justify our dissent from Dr. Hesse's statement that homoquinine is a modification of quinine and that it is completely convertible into quinine. The more precise interpretation of these results must be left until we are able to obtain a more adequate supply of material than the two or three grams of homoquinine crystals we have operated upon hitherto. It may, however, be suggested that these results, taken together with those by which Dr. Hesse has proved the individuality of homoquinine, furnish evidence that this latter alkaloid is susceptible of being split into two other alkaloids, one of them being either quinine or a base closely resembling it, the other an alkaloid not hitherto observed, to which we will provisionally give the name of "cupreine." Our results also explain why homoquinine is not found in the commercial quinine sulphate made from cuprea bark.

INTERNATIONAL FORESTRY EXHIBITION AT EDINBURGH.

(*Continued from page* 203.)

India.

The Indian Department occupies the whole of the right hand portion of the central transept, and the collection of drugs from the different provinces forms a prominent feature of the exhibit. Although a notice of the other forest products would be somewhat out of place here, attention may be directed to the numerous uses made of the timber of the padouk tree, *Pterocarpus Indicus*, which yields also a liquid kino. The teak tree is worthy of note as having been the means of drawing the attention of the Home Government to the importance of conserving the forest trees of India, and of having thus led to the establishment of the Forestry Department in India. Colonel Michael has adopted a simple but ingenious method of showing the structure and grain of the timber exhibited. A section of the trunk is sawn half way through longitudinally, and then half through horizontally, and a portion obliquely, showing in one piece what is only observable from three pieces in other exhibits. A very interesting account of the history of the establishment of this department is given by Sir George Birdwood in the first catalogue of the Exhibition. From his report the last sentence may be quoted, since at least this department of the Exhibition should not be alluded to without giving the credit that is due to the two gentlemen therein mentioned.

"It is a happy omen that the first International Exhibition of Forestry should have been appointed to be held in the stately capital of Scotland, where scientific forestry throughout the British empire received its earliest impulse, and that the Exhibition should be so much indebted for its prosperous issue to the co-operation of Colonel Michael, the pioneer of practical forestry, and of Dr. Cleghorn, the father of scientific forestry, in India."

The largest collection of Indian drugs is that described as the "Index Collection," sent by the Government of India, and includes, besides other forest products, gums and resin; dyes, tans and mordants; oil seeds and medicinal products, all arranged in groups. Other collections worthy of notice are those sent by the District Officer of Malabar (2); by the Assistant Conservator of Forests in Kanara, Bombay (32), the specimens being in good condition and accompanied with useful information on the labels; by the District Forest Officer, Coimbatore, Madras (35); by the Conservator of Forests, North Division, Bombay (27); and by the District Forest Officer, Tinnevelly (36), the two last named being evidently carefully selected and labelled. Allowance, however, must evidently be made for some of the other collectors, with whom there has evidently been a great difficulty in obtaining bottles and printed labels.

The drugs in these collections from the different provinces are of course many of them identical, and have most of them been described by Dr. W. Dymock in his valuable 'Materia Medica of Western India,' as well as in papers in this Journal on the same subject. A few of the articles, however, may be noticed here.

Khasya Turpentine.—This is prepared in Assam from *Pinus Khasyana* in a very crude fashion, which may be summarized as follows:—

A hole is cut 9 to 12 inches wide, 6 to 9 inches high and 2 to 3 inches deep in the trunk of the tree about a foot above the ground. A strip of the bark and a little of the wood 12 inches wide and 4 feet up the tree is then removed. When the turpentine has well exuded and become solid which takes place in about twelve months, it is removed, and the wood, cut up in small pieces, 2 to 5 inches long and $\frac{1}{4}$ to $\frac{1}{2}$ inch thick, is placed in earthen pots, which are covered with perforated leaves and then inverted over holes made in a hearth cut out of the hill side. This is so arranged that when hot ashes or burning charcoal are placed around the inverted pots the turpentine runs through holes in the hearth and is received in pots placed at its outer edge; $6\frac{1}{4}$ lbs. of wood are found to yield 1 lb. of turpentine, but this is not the whole that could be obtained, as there is some waste in the process. The wood used for the purpose sells locally at the rate of 80 lbs. for a rupee.

Among other drugs noticed were, *Blumea lacera*, an Indian plant recently described in this Journal by Dr. Dymock; *Amomum subulatum*, the source of Nepal cardamom, identified during the last few years; plantain seeds, to which attention has recently been directed by Mr. W. T. Thiselton Dyer; and the aloe wood of Scripture, *Aquilaria Agallocha*. In the Malabar (2) collection a sample of the bark of *Syzygium jambolanum*, recently recommended for the treatment of diabetes, may be seen. Several specimens of jequirity seed (*Abrus precatorius*) of different colours are exhibited from different provinces, those in a very excellent collection of drugs from Cuddapah being of a pure white colour, while a

second sample of a buff, and a third of a purplish-black hue, are contributed by the district officer of Arcot. Specimens of these have been kindly presented to the museum of the Society by Colonel Michael, and together with a dark brown specimen from British Guiana were lent for exhibition at the meeting of the British Medical Association at Belfast, where the subject of *Abrus precatorius* was discussed. Some fine specimens of native vegetable fixed oils are exhibited by Mr. J. H. Brougham, of the Anantapur district, and some essential oils by Professor Lawson, the recently appointed Director of Gardens and Cinchona plantations on the Neilghery Hills. Those sent include the oils of *Gaultheria fragrantissima*, *Eucalyptus Globulus*, *E. piperita* and *Andropogon citratus*, DC., or lemon grass. Fine specimens of the bael fruit, cassia fistula pods, nux vomica seeds, including the valuable variety grown near Bombay, and many other familiar drugs too numerous to mention, may be seen well represented in this department.

Before leaving the Indian court the visitor should not neglect to see a very complete set of the vegetable dyes of India shown in silk, etc., by Mr. T. Wardle, of Leek, Staffordshire.

Burmah.

The Conservator of Forests, Pegu Circle, exhibits, among other articles, three varieties of cutch (*Acacia Catechu*) wood oil, and an indiarubber obtained from *Chavannesia esculenta*, which appears to be of excellent quality. A number of tanning materials are also shown here in sufficient quantity to permit of chemical examination, which it may be hoped will be undertaken by chemists interested in these products. From Oudh there is exhibited a new tanning product in flat cakes like those of *Areca Catechu*, known as sal extract, and said to be obtained from the bark of *Shorea robusta* ; and from Assam, some fine specimens of the rubber of that country.

Andaman and Nicobar Islands (16).

The objects of pharmaceutical interest here are few in number, although the magnificent specimens of polished timber vie in beauty and size with any in the Exhibition. Some fine specimens of wood oil or gurjun balsam are here exhibited which present the appearance of an emulsion, and appear to have been obtained from the tree without heat. By the Burmese this oleoresin is used in leprosy and for gonorrhœa, and also in the arts, for mixing paint and as a varnish, and for rendering torches inflammable. Some fine pieces of a resin named ingdwe, derived from *Dipterocarpus Hasseltii*, are also shown here. When dissolved in benzol this resin makes a rapidly drying varnish for photographic plates. It is of pale colour, and appears to be hard. It is used by the Burmese for stiffening varnishes, and for caulking and other purposes.

Cape of Good Hope (33).

This is only a small exhibit; specimens of dried aloes juice, bush tea (*Cyclopia latifolia*), and the tanning barks of *Acacia decurrens*, *Podocarpus latifolius* and *Leucospermum conocarpum*, are almost the only drugs exhibited. The wood of *Oreodaphne bullata* is remarkable for its disagreeable odour, whence its name of "stink wood." Specimens of the wood from which the natives make their assegais are also shown.

Cyprus (34).

This is a small exhibit. Specimens of the resin of the *Cedrus Libani* and of *Pinus Laricio* are here exhibited, and sumach leaves (*Rhus Coriaria*), used in tanning.

Mauritius (35).

This exhibit consists principally of a fine collection of fibres. There are, however, good specimens of indiarubber, representing the different plants from which it is collected in the island, viz., *Vahea madagascariensis*, *Ficus elastica*, *Cryptostegia grandiflora* and *Manihot Glaziovii*. The last named is cultivated in the island.

Ceylon (38).

Although small in comparison with the Indian collections, the Ceylon exhibit is a well arranged and an exceedingly interesting one. The exhibitor, Mr. J. Alexander, has an estate in Ceylon and has evidently taken great pains to illustrate all the productions of that island.

The first object to attract attention from a pharmaceutical point of view is a series of cinchona barks, accompanied with drawings of the plants, together with neat specimens of flowering twigs mounted on cards. These are beautifully prepared, the leaves and flowers having retained their original colours better than any specimens the writer has seen. The species illustrated are *C. succirubra*, *C. robusta*, *C. officinalis*, vars. *Condaminea* and *crispa*, *C. Calisaya*, vars. *vera* and *Javanica*, *C. pubescens*, *C. Ledgeriana* and *C. micrantha*. Both natural and renewed barks are shown, and in some instances root bark and shavings as well. A box of the tools used in collecting and harvesting the bark illlustrates the process of renewing the bark, which is rendered more easy to understand by an album of photographs which represents the collection of cinchona, as well as that of cinnamon and of other products. The tools consist of an American box shaver, a cast iron concave and a convex shaver, and a small and large peeler for stripping off the bark. An ordinary pruning saw and a large pruning knife are also used in the process, but as they are not special tools they are not shown.

Before the visitor has remained a few seconds in front of this exhibit he becomes sensible of a delicious fragrance, the source of which is not at first apparent; it proceeds, however, from a window-screen close by which is made of the roots of kus kus (*Andropogon muricatus*), used in Ceylon and India, when sprinkled with water, to cool and perfume the air, but in this country the root is better known under the name of "vittie vayr" or "vetivert," and chiefly used as a preventive of moths. Beside the collection of cinchona barks there is a number of other barks used in medicine by the natives, whose names and uses for these barks are not devoid of interest. As but little is known on these points, Mr. Alexander kindly allowed the use of his notes for the purpose of recording such information here. To these a few additional notes have been added, which have been enclosed in brackets.

1. *Acacia concinna* "Hingooroo-wel."—The decoction of the bark is used for ulcerated throat. [In other sections of the Indian Department these fruits are shown as a tanning material.]

2. *Acacia stipulata*, "Mara."—Used for swellings.

3. *Artocarpus integrifolia*, "Cos."—The inner bark of the root of the Jack tree, which is of a rich orange colour, is used in dyeing the robes of the priests.

4. *Alstonia scholaris*, "Rookatana."—In Ceylon this

bark is used in the treatment of cutaneous and scrofulous diseases. [In the Philippines it is used in fever and in India in dysentery.]

5. *Bombax malabarica*, "Kata imbil."—An astringent gum is obtained from the bark.

6. *Briedelia retusa* "Kata-kēla."—The sap from the bark is used in the treatment of sores.

7. *Barringtonia racemosa*.—The decoction of the bark is considered to be a good tonic.

8. *Careya arborea*, "Cahatta."—Used in medicine as an astringent. It is considered to be one of the best tanning barks in Ceylon. [The bark being fibrous is also made into a rough cordage, and in some parts of India is said to be prepared for use as a slow match. According to Dymock, it contains much mucilage and is used for preparing emollient embrocations.]

9. *Celtis dysanocyton*, "Gooranda."—A piece of this bark hung up near a dwelling-house is used as a charm to drive away evil spirits. This bark when broken has a disgusting odour, like that of human fæces, which is also possessed by the wood [and is probably due to the presence of naphthylamine].

10. *Cinnamon.*

11. *Calosanthes indica*, "Jobilla."—Said to be used as a dye. [In India, however, it is held to possess powerful diaphoretic and slight anodyne properties. Dr. Evers treated twenty-eight cases of acute rheumatism with the bark and in all the results were most satisfactory. He considers that when combined with opium it is a much more powerful sudorific than the compound ipecacuanha powder. The dose of the powdered bark is 5 to 15 grains in infusion (Dymock, 'Mat. Med. of W. India,' p. 457).]

12. *Cassia Fistula*, "Ahalla."—A decoction of the bark is used as a purgative.

13. *Cascaria zeylanica*, "Walwaraka.—The bark is used as an anthelminthic.

14. *Cyminosma pedunculata*, "Anu kenda."—The extract of the bark is used as an application to bruises and sores.

15. *Cratœva Roxburgii*, "Luruwarana."—Said to yield a medicinal oil.

16. *Eugenia revoluta*, "Welle damba."—Used for bruises.

17. *Eugenia assimilis*, "Kosdamba."—The juice from the bark is considered to be cooling and is used for rubbing over the skin.

18. *Ficus laccifera*, "Nugu."—The lac insect lives on the bark.

19. *Glycicarpus racemosus*, "Balla."—The juice of the bark causes great pain and swelling.

20. *Garcinia Morella*, "Gamboge."—The bark is used as a yellow dye.

21. *Gmelina Rheedii*, "At-de-Mettia."—The decoction is given to women after childbirth.

22. *Phyllanthus emblica*, "Metti."—The bark is used in tanning as well as the fruit and is considered one of the best for the purpose. [In the Indian exhibit from Cuddapah some very perfect fruits of this plant may be seen.]

23. *Lœa Staphylea*, "Booroola."—The young stems are used as a remedy for fever.

24. *Macaranga tomentosa*, "Kenda."—Used for cuts and bruises.

25. *Nauclea cordifolia*, "Collong."—A cooling plaster is made from an extract of the bark.

26. *Nauclea sp.*, "Bakome."—The decoction is used for venereal diseases.

27. *Paramigyna monophylla*, "Wallangeriga."—Used as a dye. [In Goa, according to Dymock, it is used as an alterative tonic.]

28. *Pongamia glabra*, "Madul Carrandu."—The inner bark is used in medicine [probably for cutaneous diseases].

29. *Sapindus laurifolius*, "Penella."—The decoction is employed as a tonic.

30. *Symplocos coronata*, "Allu bombe."—Used in ophthalmia. [*S. racemosa* is employed for the same purpose in India.]

31. *Schleichera trijuga*, "Cong."—Used in tanning.

32. *Tabernæmontana dichotoma*, "Diwi Kadaru."—Used as an application to bruises.

33. *Thespesia populnea*, "Gau surria."—Used for bowel complaints.

34. *Terminalia Chebula*, "Arallo."—Used for tanning.

35. *Tinospora cordifolia*, "Rassa sinda."—The young stems are used in fevers.

36. *Vitex altissima*, "Melilla."—Possesses purgative properties.

The specimens of native oils exhibited include those of *Azadirachta indica*, *Bassia longifolia* or mee oil, *Canarium zeylanicum*, or kekune oil, *Calophyllum Walkeri* or kina oil, and those of *Corypha umbraculifera*, *Dipterocarpus glandulosus*, "Dorana," and *D. zeylanicus* or hora, and others which are better known.

Cocoanut oil is represented under three varieties,—the ordinary, an extra fine quality used for hair oil, and the oil of the king cocoanut, which is a large variety of the fruit. Arrack, vinegar, treacle, and numerous other products illustrate the value of the cocoanut palm to the natives, and a similar series of one hundred and seventy articles shows the importance of the Palmyra palm, *Borassus flabelliformis*, in native industries. Tapioca and arrowroot are two of the products obtained from this palm, and splints form another. The arrowroot, which appears to be of fine quality, is obtained from the root.

Besides the barks, of which a list has been given above, there are a series of roots and herbs used in medicine neatly arranged and numbered in separate compartments in a show case. Many of these are familiar as well-known English or Indian drugs. Others less known are—

Guilandina Bonduc (3), "Kooboora."—The root is used in diarrhœa.

Flemingia strobilifera (4), "Han Pilla."—Use not mentioned.

Justicia Adhatoda, "Paa Wetta."—Used in fevers. [In India it is employed as an expectorant and antispasmodic.]

Jasminum flexile.—The leaves and twigs are used for toothache.

Other remedies which do not seem to be used in India, but concerning the properties of which there is no information available at present, are:—*Lagenandra laurifolia*, *Cynoctonum pauciflorum*, *Xylopia parviflora*, or "Nattu," *Gymnema rotundatum*, or "Kerri angoona," *Clematis Gouriana*, *Alternanthera sessilis* or "Mokoo-wana," *Phaseolus radiatus*, or "Wal-maa," *Piliostigma racemosa*, or "Myla," *Nymphæa stellata*, and *Elettaria involucrata*, or "Arrata." The last named root bears a close similarity in colour and general appearance to galangal root, and, were it not for the difference in flavour, might easily pass for that drug.

Other commercial products worth notice are a very fine specimen of graphite, dug from the pits in the low country, sappan wood, the oils of lemon grass and citronelle, and cardamoms. The last named is an article of considerable cultivation in the island, being reckoned by the planters as the fifth in importance, the others being coffee, tea, cinchona and cocoa.

The orchella weed exhibited appears to be the *Roccella Montagnei*.

(*To be continued.*)

THE CAUCASIAN PETROLEUM REGION.*

The great Caucasian range, capped with snow and often hidden in the clouds, and stretching from sea to sea (and the Caspian had a very much larger area in former times), must have seemed the boundary of the earth to the earliest inhabitants. Even at the time when the first glimmerings of civilization began to dawn upon the world, at the time when Homer sang, the Caucasus represented that boundary. It was there that Ulysses reached the limit of Neptune's kingdom when he was sent by Circe to consult the oracle of the infernal gods. Beyond the western edge of this range, in the neighbourhood of Kertch and Taman, the Cimmerians lived in a land of darkness and horror. But those evil-smelling waters, those noxious gases, mud volcanoes, and petroleum springs, which then seemed so hateful, are now considered goodly lights by speculators intent on making gold. Thus the terrors of one generation become the joys of another. The Caucasus were the scene of the agony and defiance of Prometheus. It was at their base, also, that the Phasis flowed over its rich bed, and it was there that Jason went to seek the goldern fleece. The Caucasus formed the eastern boundary of the Roman Empire. In later days the waves of savage hordes from the mysterious eastern steppes surged along the spurs of these mountains; and it is perhaps thus that we find so many different tribes inhabiting the valleys at the present day, for in all times the oppressed have fled to the mountains for refuge. Seventy different languages, it is asserted, are to be heard in the Caucasus, and at least half of them are represented in Baku. In our own times the struggles of the mountaineers against the encroachments of Russia have cast an undying renown upon these wild tribes, whom we know best as Circassians, and their hero prophets, culminating in Schamyl, will be the theme of bards for generations to come.

Once, again, has the Caucasus become the centre towards which the eyes of Russia are directed; but it is no longer poetry or war that forms the attraction, it is an act of peace. For the moment the sounds of war are hushed that men may gather the stores of wealth which nature has hidden in this most interesting land. And it is with a feeling akin to astonishment that the Russians learn that such wealth does abound and only waits to be gathered. So long has Russia looked abroad with envy and despair at the commercial prosperity of others, that it is with a smile of satisfaction that her people talk of Baku and of the great petroleum industry which has recently been rising there. In the railway carriage, or at the social board, or wherever people meet, the conversation sooner or later turns to the subject of the commercial position of Russia (a subject upon which her children are very self-conscious) and to the petroleum industry. It is the first industry in which Russia has achieved or is achieving a real success, and it is considered as the first wave of a great tide of prosperity. The man who may be said to have created the industry has become one of the most popular men in Russia, and his name is upon everybody's lips. This is Mr. Nobel. Up to the time that he commenced to utilize the petroleum of Baku he was known as a successful engineer who supplied the Government with arms and projectiles; but his energy, enterprise, skill and daring in a more peaceful field have gained him distinction in Russia. He has become are presentative man; he is the Skobeleff of national industry.

This industry, which he has done so much to extend, is one that is full of interest from its far-reaching possibilities, as will be seen from a hasty glance at its various phases, a glance which, through the kindness of Mr. Nobel, I have been permitted to take.

Even before reaching the Volga, that is to say, at St. Petersburg and Moscow, the indications of the great organization for the distribution of the refined petroleum are found. Huge round iron reservoirs, in shape closely resembling gasometers, are seen at the stations, and the long trains of boiler-shaped tanks stamped with Mr. Nobel's name tell their own story. These are the depôts from which the oil is sent to the smaller towns and to the villages. The quantity of oil must surely be great if these large reservoirs are to supplant the familiar blue-painted American barrels.

Nor is this inference belied; for during the whole of the journey from Nijni Novgorod on the upper waters of the Volga to Astrakhan at its mouth, the great influence of petroleum in some form or another is continually felt. It is, in fact, the fuel which generates the steam. One can wander at liberty over the vessel and stand by the boilers, where no busy stokers are sweating under heavy loads of wood or coal carried in a stifling atmosphere, but where the fireman stands calmly watching the self-feeding fires. He has so little to do that he can enter into conversation with the visitor and tell of the advantages which he finds in the use of his new fuel. Save at long intervals, when he sets a pump in motion to fill his working tank of oil from a lower reservoir, his only occupation is that of watching the long flames which roar with deafening noise through the tubes of his boiler. And so the days pass on; and before one reaches Astrakhan a comparision with the old days is made when long hours of waiting at many small villages by the banks of the river had to be patiently endured, while now, during a short rest of half an hour at some tank-barge, the steam pumps under the direction of one of Mr. Nobel's engineers put on board sufficient fuel for the day's journey. And the same fuel is used on board the Caspian steamers which bear the traveller to Baku, the seat of the petroleum industry.

Baku is situated on a bay which forms the south side of the Apsheron peninsula, which is an extension of the Caucasus Mountains as they gradually slope onwards and finally sink below the sea. The Apsheron peninsula is about forty miles long, and its average breadth is fifteen miles. The south side is bleak and arid, though on the north there are gardens, where also the vine is grown over a large area. Round Baku the country is a mere desert. On the west are the hills which represent outlying spurs from the Caucasus, but these become lower and lower towards the east, which is a plateau with the average height of about 200 feet, and further east still the downward slope is continued till the land ends in a long sand-bank curved round to the south. An island lies across the mouth of the deep bay and thus protects it from the wild winds which often blow from the south. The town of Baku lies towards the west side of the bay, while about two miles or more to the east a dense and heavy black cloud of smoke hangs over the Black Town where the oil refineries are situated. Baku is thoroughly Oriental; though under the rapid growth of new houses it is losing its characteristic features. It possesses a large citadel whose walls are flanked with round towers pierced for artillery. Within the citadel was the dwelling of the true believers, for the mosques are gathered there, and the minarets, though heavy, possess some rather elegant carving in stone. Narrow streets, houses with flat roofs and covered verandahs, and furnished with courtyards closed against prying curiosity; large dome-like chimneys, whitewashed and conspicuous in the bright sunshine; these are the features which strike a stranger from the west. The bazaars where Tartars, Persians and other Mussulmans gravely sit and smoke their *chibouks* or *narghilehs* while they wait for customers who never seem to come; the tall Tartars, perched on the top of the load which their small donkeys are patiently carrying; the armed mountaineers swaggering along with a supercilious glance which cannot take away their cut-throat appearance; the veiled women, wrapped in loose robes from head to foot: these are all to be met on every side along with Russian soldiers and sailors, and officials in civil service uniform. It is computed that of the forty thou-

* From *The Times*.

sand or more inhabitants of the town a fourth are Russians, another fourth Armenians, and the rest Tartars, Persians, and representatives from the numerous mountain tribes.

The climate of Baku is very dry, the rainfall being only about 9½ in. It is not unhealthy. In summer it is very hot, and the winter resembls that of the South of England. The feature which above all other is characteristic is the strength and frequency of the wind. Gales succeed each other rapidly, and the dust is so great that a white cloud hangs over Baku, which is almost as constant, if less forbidding, than the pall of the Black Town. The prevailing winds are from the north or the south ; they always blow along the length and not across the breadth of the Caspian. It is only about seventy years since Baku was finally annexed to Russia, and the people have not yet become subject to law and order. In fact, a great amount of turbulence and disorder prevails. The roads are infested by marauders, and there is little security for life and property outside the limits of the town. Deeds of violence are rife. Recently the manager of the well-known oil well called the Nazareth, at Balakhany, was murdered under circumstances of great brutality, along with his assistant, by some men who had lost a few shillings over a labour contract. The previous day a detachment of mounted Cossacks came in conflict with a band of robbers, one of whom at least they killed, having one of their own number grievously wounded, who now lies in a precarious condition in the hospital at Baku. It is surrounded by such people that the industry must be carried on. Workmen may be seen going about their daily tasks armed to the teeth. Their own savage customs are still in full force ; men from neighbouring villages which are at fued will not work together at the same well. The law of blood revenge is as operative to-day as ever it was. Cruel, bloodthirsty, and treacherous, the people acknowledge no law save force.

Petroleum in some one or another of its various forms has been familiar to mankind from the earliest times. Sir Lyon Playfair has recently suggested (*Good Words*, February, 1884), that in some cases at least asphalte was the substance referred to in the Bible which has been translated by the word "salt." By the shores of the Dead Sea, and in many other places, this subsance has been found from time immemorial. The Guebers, or Fire Worshippers of Persia, knew of the natural issue of gas at Surakhani in the neighbourhood of Baku, and they set up their altars there before the fires which they kept burning. They were succeeded by emissaries from the Parsees of India, so that for many centuries, down even to very recently, these fires were tended by priests ; and this gave rise to the name "Eternal Fires," to which reference has frequently been made by travellers in these regions. But these fires have lost their eternity and their sanctity. The cells are deserted, the temple is going to ruins, the priests have departed ; and now, though the gas still issues, it is used to burn lime or to drive steam-engines. These, then, are the base uses to which the heaven-stolen fire has come to ; for the people in the neighbourhood connect Surakhani (which, translated, is "the house of fire") with the legend of Prometheus.

Of all the oil-springs in the Caucasus the greatest quantity of petroleum has always been obtained from the plateau about eight miles to the north of Baku upon which the village of Balakhany is situated. From time immemorial wells have been dug there, and the thick, viscid, greenish-brown liquid which oozed from the soil has been put into goat-skins (called voordooks), and carried on the backs of camels to the villages in the interior. The strings of camels bearing these primitive bottles may be seen at the present day winding their way over the desert tracks on their journey to the towns and villages of Daghestan. Afterwards came the era of barrels. No wood grows along the arid shores of the Caspian; and the steppes of Southern Russia, however generous the soil may be, are now deprived of all the forests which once existed there. Barrels or wood had, therefore, to be brought from the Volga and Kama, and from the smaller tributaries which flow through the dense forests in the north; and this, of course, was expensive. The barrels, filled with crude petroleum, were carried down to the port of Baku in arbas to be shipped to Persia and other places along the Caspian shore. From the time of Marco Polo this trade has been carried on, and no doubt in entirely the same manner. The arbas are the strangest of vehicles drawn by horses. Two enormous wheels, generally about seven feet in diameter, are fastened to an axle which rotates with them. Above the shafts is a small wooden framework in which part of the load is carried, while hanging below the shafts is the other part. A stalwart Tartar with huge sheepskin cap is generally perched on the top, and the arba, in the construction of which no iron enters, groans as it slowly moves towards the town.

The discovery of petroleum in August, 1859, in America, which created so much excitement and speculation, was not without its effect on Baku. By this time Sir Lyon Playfair's suggestion had been acted on by Mr. James Young, of Kelly, and the petroleum and paraffin industry of Scotland was firmly established. Slowly, very slowly, native speculators turned their attention to the improvement of the methods of working at Baku; but even if they had been possessed of skill and enterprise they could have effected little, by reason of the heavy burden which the Government put upon this, as upon all other industries.

An Armenian named Meerzoeff had a Government concession for the sale of all petroleum raised from the wells, and so long as this lasted progress was hopeless. Gradually the opposition to this system increased, and ultimately, in the year 1867, a commission of inquiry was appointed whose labours resulted, in 1872, in the abolition of the monopoly and the imposition instead of a duty. In 1878 this also was abolished, and the petroleum industry was at last free to develop itself according to the laws of commercial progress. It was largely due to the exertions of Mr. Nobel, who had shortly before appeared on the scene, that this step was taken by the Government—a step which led to the enormous extension of the industry, as may be seen from the following statistics taken from the large book of Mr. Ragosin on "Neft." In 1850 the supply was about 1,300,000 gallons; 1860, 1,500,000; 1865, 2,771,000; 1870, 8,572,000; 1875, 29,045,000; 1880, 140,000,000; 1882, 200,000,000. The quantity of oil raised from the American wells in 1882 was 1,200,000,000 gallons. The history of Mr. Nobel's operations in the face of very great natural obstacles, and still more those due to corrupt officials, could it be entered on here, would be both interesting and instructive as showing the real economic condition of the country. It is sufficient to state that he found all the operations conducted in the most primitive manner, but that in the course of a very few years, by the aid of his brother (who has lately retired from the business owing to bad health) he has made an organization which is unique in Russia. The refinery at the Black Town of Baku is the largest in the world, and is the admiration even of Americans who have been attracted all the way from Pennsylvania.

At present the operations of the petroleum industry are conducted thus:—Wells are sunk on the plateau of Balakhany from whence almost the whole of the oil is now obtained. The geological features of the plateau will be again referred to, but it is sufficient to state here that the area now being worked for oil is only about three or four square miles. This is known to be but a very small fraction of the total area of the petroleum field, yet the quantity of oil obtained is so very great that no inducement exists for risking the expense of boring in less favourably situated places.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 20, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

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DR. ANGUS SMITH ON THE EXAMINATION OF WATERS.

IT is well known that notwithstanding the immense advance made during the last few years in the application of chemical science to the examination, as to their purity, of articles of food and drink, there has been a growing tendency amongst physiologists and chemists to distrust inferences drawn from the results yielded by even the most favoured chemical methods for the examination of water. Indeed, this doubt has more than once found official expression in reports from important sanitary departments, both in this country and the United States, to which reference has been made from time to time in this Journal. For instance, the important experiments conducted under the superintendence of Dr. BUCHANAN, about two years ago, seemed to show that water intentionally contaminated with a dangerous quantity of fever stool would probably be passed by the most expert analyst as "safe," which led him to express the opinion that it is not justifiable to speak of a water as "safe" or "wholesome" if it contain a trace of organic matter; hardly, indeed, if it contain none of such matter appreciable by the most delicate methods. Of course, the main difficulty arises in discriminating between the significance of substances vastly varying in potency although behaving similarly towards the most delicate chemical reagents. At this juncture, therefore, the appearance of a report on the examination of waters, from the pen of the late Dr. ANGUS SMITH, written in his capacity as inspector under the Rivers Pollution Prevention Act, in which he describes methods that he evidently considered capable of being used in the measurement of the activity of bacteria present in a water and perhaps of their physiological significance, is worthy of at least a passing notice.

The method described in the first part of this report is based upon the observation that sugar dissolved in water undergoes fermentation with the evolution of hydrogen if microbes be present. The liability of sugar to undergo fermentation in contaminated water was, as is well known, pointed out several years ago by Dr. HEISCH, but the application by Dr. SMITH of the phenomenon is different. The water to be examined, with one per cent. of grape sugar added, is introduced into a test-tube, which is inverted, sealed at the bottom by mercury and allowed to stand. Usually after about five days gas begins to collect, which left to accumulate for several weeks will vary in quantity from none to 14 c.c. from 50 c.c. of water. This has been found to consist of a mixture of pure hydrogen, nitrogen and carbonic acid, the last mentioned frequently in minute proportion. According to Dr. SMITH the evolution of hydrogen is the characteristic phenomenon and the measure of zymotic activity. In nearly all the natural waters examined by him the sugar underwent fermentation and hydrogen was evolved. Sometimes the quantity of this gas given off was very small; but it increased in proportion to the known impurity of the water. It was, however, entirely absent when distilled or previously boiled water was used, though in these cases the evolution could be set up by the addition of microzymes. As a rule suspended matter in a water always gave a greater amount of hydrogen and other gases than matter in solution, and the results were also affected by the proportion of sugar or the addition of bacteria or certain chemicals, such as sodium phosphate or ammonium sulphate; but when the conditions of the experiments allowed of a comparison being made the results are said to have been fairly uniform.

Before referring to the inferences which Dr. SMITH has drawn from these results, it will be convenient to refer to another method of detecting and putting in evidence the presence of organisms in water, described in the third part of his report, which consists in an application of Dr. KOCH's gelatine process. The method of working is to prepare a clarified solution containing 5 per cent. of solid gelatine, which is liquid at a temperature of about 80° F., and to add to a small quantity of this contained in a test-tube an equal quantity of the water to be examined, the mixture being kept for a few minutes at the liquefying temperature before being allowed to set. Under these conditions, after a time, if microbes be present, a liquefaction of the gelatine occurs which appears to be in proportion to the zymotic impurity of the water. In waters such as are frequently drunk,—Manchester water, for example,—the whole tube will frequently become full of perfectly formed transparent spheres, which contain a liquid resembling the solid gelatine in composition, and a deposit of active and inactive bacteria. In waters presumably more pure, these spheres are replaced by minute dots filled with bacteria that do not seem to exercise the function of liquefying gelatine. On the other hand, in sewage and other very impure waters the gelatine is rendered liquid at the surface, the fluidity increasing in depth until it includes the whole of the gelatine. Upon examination of the liquid it is seen to be alive with bacteria. Sometimes, in the case of very impure water, the gelatine will prevent the access of a sufficiency of oxygen to

allow the organisms to have full play, so that the full liquefaction of the gelatine may not take place at once. The liquefaction is also retarded by the presence of a "disinfectant," and it is suggested that the process might therefore be utilized in measuring the power of this class of agencies. The action seems to be intensified by the addition of sugar or sodium phosphate, but the results are somewhat obscured, and Dr. SMITH found the simple gelatine sufficient for detecting minute impurities consisting of organisms capable of effecting its transformation in the manner indicated. It may be mentioned that the value of this part of the report is enhanced by a series of photographs illustrating the appearance of test-tubes of gelatine to which various samples of water had been added.

The questions then arise, whether the microbes that transform gelatine and those that cause the fermentation of sugar with the evolution of hydrogen are the same in kind; and the extent to which they are to be deemed noxious or innoxious when present in a water intended for drinking purposes. With respect to the former question, Dr. SMITH says that the results obtained with the two processes corresponded very fairly and that the probability is in favour of an affirmative reply. The second question is, however, perhaps more difficult to answer. It may be granted that the volume of hydrogen evolved or the quantity of gelatine liquefied may be taken as a measure of zymotic activity, but it does not at all follow that the activity is not that of innocent microbes. Dr. SMITH himself recognizes this difficulty fully and seems to have hesitated at first in publishing his results lest an exaggerated significance should be attached to them. He expressly states that, so far as he could observe, the formation of some of the clear spheres in the gelatine mixture, such as that mentioned as occurring with Manchester water, might be consistent with the water being unobjectionable for drinking purposes; though he was disposed to think that the fewer the spheres the better and to consider them a measure of quality to some extent. It is evident also, in the light of M. PASTEUR'S experiments, the same kind of organism may be capable of effecting different degrees of mischief in the body into which it may be introduced, although it may attack both sugar and gelatine to the same degree in its "virulent" and its "attenuated" conditions. Dr. SMITH has, however, put on record his opinion that notwithstanding these considerations, these methods of measuring zymotic activity deal essentially with bodies of an offensive character, unless it could be imagined that many classes of microbes are mixed up together in different waters in such a manner as to be always in similar proportions, since there is the fact that they increase progressively from the purest mountain water to the foulest sewage. This opinion receives a considerable amount of confirmation from he results of a large number of experiments that are appended to the report, which seem to indicate—clearly, Dr. SMITH says—that the organisms which effect the decompositions in question are such as, when they occur in large numbers, "render water impure to the senses." Of course this would not be sufficient alone to identify them as the producers of zymotic disease, and it would be interesting to ascertain whether cultivations of the organisms which have been associated with various diseases are capable of setting up the hydrogen fermentation of sugar or of liquefying gelatine. Nevertheless, the experience recorded in this posthumous report is a decided contribution to our knowledge of the life history of a class of beings that are continually producing effects enormously exceeding themselves in visibility, and it cannot be doubted that although the pioneer in this promising bye-path of science has fallen ere he had well entered it, there will be others who will take up the exploration and continue it until the unknown shall become familiar.

The meeting of the American Pharmaceutical Association in Milwaukee commenced on the 26th ult., and appears to have been moderately well attended, rather more than a hundred members having signed the roll book. The meeting was called to order on the first day by Mr. Thompson, who delivered a practical address, in the course of which he lamented that the Association only numbered fifteen hundred members. On the following day this gentleman gave up the chair to the new President, Mr. J. Ingalls. The papers read seem to have been even less numerous than at the previous meeting, and were not reached until the third or last day, most of the discussion having turned upon business topics, including some critical remarks upon the admission into the exhibition of articles that had been laid under the ban of the Association. The proceedings of the Entertainment Committee, as usual, occupied a prominent place in the attention of the meeting. This undue amount of talk upon non-scientific subjects seems, however, to have been looked upon with disfavour by the majority of members present, and apparently with a view to check it in future years, a resolution was passed to the effect that hereafter discussions on other than strictly pharmaceutical subjects shall be omitted from the published proceedings. A Committee was appointed to report at the next meeting on the best plan for compelling manufacturers of patent medicines to state the formulæ of their preparations.

* * *

The thirteenth annual meeting of the German Pharmaceutical Association, which was held in Dresden, on Wednesday, the 3rd inst., and two following days, under the presidency of Dr. Brunnengräber, was attended by about three hundred and fifty members. Visitors from other countries were also present, including a considerable number from Austria and Hungary. The report showed that subscriptions had been received from 2794 members, and that the income for the year had amounted to £2200. The net cost of producing the *Archiv der Pharmacie* and supplying copies to the members was set down as £962, and subsequently a resolution was passed instructing the Council to convert it into a weekly journal. It was also announced that the Council

had appointed a Pharmacopœia Committee, which had chosen Herr Pusch as its chairman. Among the subjects discussed by the meeting were the employment of apprentices in pharmacies, the supply of goods to private persons and hospitals by certain manufacturing and wholesale dealers, the benevolent funds and patent medicines. Before breaking up it was resolved that the Association should meet next year in Königsberg, Prussia. A pharmaceutical exhibition was also held in connection with the meeting.

* * *

At the last semi-annual meeting of the Council of the Ontario College of Pharmacy it was resolved that diplomas or certificates by examination of the Pharmaceutical Society of Great Britain shall be accepted by the College and that the holders shall be permitted to register without examination. The same privilege is to be extended to sundry Canadian and United States Associations and Colleges, provided that they accept upon a similar footing the certificates of the Ontario College. It may be remembered that a permissive authority to take this course was conferred upon the Council by the 34th section of the Ontario Pharmacy Act, passed in March last (see before, vol. xiv., p. 894). At the same meeting, Mr. Henry B. Brady, of Bristol, England, was elected an Honorary Member of the College.

* * *

Mr. Henry Sugden Evans, formerly President of the Pharmaceutical Society of Great Britain, who has recently retired from the business with which he has long been connected, has been appointed Chief Analyst for the Dominion of Canada under the provisions of the recently enacted Adulteration Act.

* * *

An invitation has been issued by a very influential committee to all persons interested in the development of scientific pharmacy, to attend a preliminary meeting to be held in Magdeburg on the 20th inst., to discuss the advisability of establishing a Pharmaceutical Society, the objects of which shall be exclusively scientific.

* * *

At the annual meeting of the Pharmaceutical Society of New South Wales it was resolved that the Society should be "incorporated by Act of Parliament upon the lines of the British Society, and that it should take under its direction and publish a journal to be called the *Pharmaceutical Journal of New South Wales.*" It was also decided to hold a pharmaceutical conference with the other Australasian colonies in Sydney at an early date.

* * *

The increased tax on "patent medicines" in Japan, referred to in these columns a short time ago (see before, vol. xiv., p. 648), and the nature of the articles to which it is extended, is reported to have largely affected the imports of some chemicals into that country. Thus santonin, an article much in request among the Japanese, showed a decrease in consumption last year amounting to about twenty thousand ounces as compared with the previous one, although the price ranged lower, and, indeed, fell to twenty cents per ounce or less than the cost of importing it. On the other hand, the consumption of quinine showed an increase.

* * *

In Tokio an establishment for the manufacture of pharmaceutical chemicals on a large scale has been set up by an incorporated company with a capital of two hundred thousand yen (about £40,000). Of this amount the Japanese Government is said to have contributed one-half free of interest for a period of twenty years, besides making a free grant of land and erecting the necessary buildings. Another similar company is taking up the utilization of the waste "saké" from the native breweries in the manufacture of alcohol. The manufacture of bleaching powder on a large scale has also been commenced.

* * *

The death is announced of Mr. George Bentham, the distinguished botanist and joint author with Sir Joseph Hooker of the recently completed 'Genera Plantarum.'

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 3rd inst. The President, Mr. J. E. Brunker, A.M., in the chair.

Present—The Vice-President (Mr. Draper), Dr. Montgomery, Dr. Collins, Sir George Owens, Dr. Aquilla Smith, Dr. J. Evans, Messrs. William Allen, A. Doran, Wells, Minchin, Hayes and Hodgson.

The minutes of the last monthly meeting, and of a special meeting, subsequently held to consider the case of Mr. Fennell, the late Registrar, and at which he was removed from the office, were read and confirmed.

The President stated that, in accordance with the directions given at the last monthly meeting of the Council, he had written a letter, on August 19, to the Inspector-General of Constabulary, informing him that the fact had been frequently brought under the notice of the Council, that the provisions of the Poisons Act (Ireland) were very generally disregarded by the retailers of poisons throughout Ireland. At the previous monthly meeting, several samples of poisons, which had been sold in the City of Cork, were submitted. These did not bear the name and address of the vendor, and the word "poison;" and in some cases neither of these labels was attached. One of the parcels contained cantharides. The letter requested the Inspector-General to issue instructions to the constabulary to enforce a stricter observance of the provisions of the Act. A letter had since been received in reply from the Inspector-General stating that the matter mentioned in his (President's) letter would be attended to.

The letter and reply were ordered to be inserted on the minutes.

Mr. Allen stated, in reference to the case of Mr. Fennell, that since the special meeting held on the subject, he had written a letter consulting Messrs. Ennis, solicitors, who had replied recommending that if no other security could be obtained, a mortgage of Mr. Fennell's stock of books should be taken and registered. A deed had accordingly been perfected and registered by Mr. Fennell's solicitor. Messrs. Ennis, in their letter, recommended that immediate possession should be taken of the property, of which an inventory had been made by Mr. Sullivan, of D'Olier Street.

The President said there were eight hundred and twenty-seven volumes.

On the motion of Mr. Hayes, seconded by Dr. Evans, it was ordered that Mr. Sullivan should dispose of the books as soon as he could do so advantageously.

An election was then held for a registrar and clerk of the Society in the room of Mr. Fennell. Mr. Arthur T. Ferrall was elected out of forty-eight candidates who applied for the office.

The Council then adjourned.

British Pharmaceutical Conference.

TWENTY-FIRST ANNUAL MEETING.

(*Continued from p.* 220.)

The next paper read was a—

REPORT ON THE STRENGTH AND CONDITION OF COMMERCIAL SPECIMENS OF HYDRARGYRUM CUM CRETA, PILULA HYDRARGYRI AND UNGUENTUM HYDRARGYRI.

BY M. DECHAN,
Analytical Chemist.
AND T. MABEN,
Pharmaceutical Chemist.

Acting on the suggestion of the Blue List, we have lately been devoting what time we could spare to the examination of commercial specimens of Hydrargyrum cum Cretâ, Pilula Hydrargyri, and Unguentum Hydrargyri. We had hoped to be able to include Pil. Hydrarg. Subchlor. Co. in this report, but the time at our disposal has been too limited to allow of this being done. We purpose confining ourselves strictly to the consideration of the "strength and condition" of the various specimens; the different methods for preparing them lie somewhat outside our present scope, and shall only be incidentally, if at all, referred to.

Hydrargyrum cum Cretâ.

The question as to the composition of this preparation has often been discussed, so often indeed that but for the sanction of the Blue List we should have hesitated to take it up. The invariable conclusion arrived at from the analysis of specimens has been that greater or less proportions of mercurous or mercuric oxides or of both are found to be present. Some of the older authorities were inclined to believe that the mercury existed in a state of mechanical division only, but few would now be found to maintain that opinion. Pharmacists are all aware that the mercury is certain to become more or less oxidized in the course of time, though it is hardly possible for us to say, without actual analysis, how far oxidation has gone, or what oxides are formed at any stage of the history of the preparation. The conditions under which hyd. c. cret. is usually prepared render it all but impossible to avoid the presence of oxide. By employing an atmosphere of carbonic dioxide, we might be certain of having only metallic mercury, and by carefully preserving the stock be able to reduce the oxides to a minimum; but the few retail pharmacists who make this preparation are doubtless of opinion that quite enough trouble is involved already without adding more, and those who purchase the drug must be content to take what the wholesale houses choose to give them.* Mercuric oxide being, to say the least, very much more active than the metal, pharmacists ought to be exceedingly careful that their stock of hyd. c. cret. should be such that no danger would attend its use. That this care is by no means so common as could be wished has been repeatedly proved, and it will, therefore, not be surprising if the result of our investigation is to add another link to the already long chain of evidence.

The method adopted by us in estimating the metallic mercury and the oxides is as follows:—

A weighed quantity is treated with excess of acetic acid, and when the carbonate is decomposed, the mixture is brought to the boiling point and then set aside to cool. The supernatant liquid is decanted, the residue being repeatedly washed with distilled water to ensure the separation of acetates. The solution contains the mercurous and mercuric oxides as their respective acetates, and to separate these it is first treated with hydrochloric acid: this precipitates mercurous chloride, which is removed by filtration, dried at 100° C. and weighed. Sulphuretted hydrogen is then passed through the filtrate, which contains mercuric chloride in solution, and the precipitated sulphide separated, dried and weighed. From the chloride and sulphide thus obtained are calculated the mercurous and mercuric oxides respectively. The residue after treatment with acetic acid consists of unoxidized mercury and any insoluble matter that may have been present. The mercury is dissolved out by means of warm dilute nitric acid, the insoluble residue being separated by filtration, dried and weighed. The filtrate, after being tested with ammonic hydrate to make certain of the absence of mercurous nitrate, is treated with sulphuretted hydrogen, and the dried and weighed sulphide thus formed gives on calculation the percentage of metallic mercury. The moisture is best taken by drying *in vacuo*; any other method we found was unreliable. The carbonate may be estimated by loss of carbonic dioxide in the usual way. We determined the proportion of chalk in a number of the specimens by means of Rohrbeck's apparatus, but as the series is not complete in this respect, we simply give the relative percentages of unoxidized mercury, mercurous oxide and mercuric oxide, the following being the detailed results of the analysis of twelve specimens:—

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Hg per cent.	22·05	30·6	32·75	30·6	34·05	34·4	32·62	30·3	49·6	31·17	21·2	35·8
Hg_2O per cent.	2·2	Tr.	Tr.	0·22	0·26	0·1	1·95	0·17	Tr.	0·52	6·15	Tr.
HgO per cent.	4·67	1·4	2·79	1·4	1·86	1·15	2·32	0·65	0·88	0·92	2·8	1·0

It will be observed that in some cases the total quantity of mercury is very much more, while in others it is considerably less than the normal (33⅓ per cent.). This may be accounted for by the tendency of the mercury, owing to its very high specific gravity, to fall to the bottom of the bottle. This hypothesis is strikingly supported by specimen No. 9, which gives over 50 per cent. of mercury, this particular sample having been the whole that was left in the bottom of the retailer's shop bottle. The obvious remedy for this would lie in the simple expedient of shaking the shop bottle, which ought, in our opinion, frequently to be done.

The comparative absence of oxide in some of the specimens and the large proportion in others are sufficiently interesting to deserve a passing notice. The manner in which the drug is prepared and stored will doubtless have a great effect on the oxidation, and may explain why samples differ so much. We have a few notes on the relative effects on oxidation of the dry and moist methods of preparation, of exposure to air and exposure to light, but as it would drag out this paper to a greater length than is desirable were we to take up these, we cannot enter on them at present. We may remark that we have prepared hyd. c. cret. by the process given in the new U.S. Pharmacopœia. When finished it had not a trace of oxide, which is more than can be said of that prepared by the British Pharmacopœia process; but it is not found that the U.S. preparation is any more able than our own to resist the influences of air and light.

Pilula Hydrargyri.

We are not aware that this preparation has ever been systematically examined with a view to the elucidation of the question as to whether oxides are or are not formed in it. Authorities generally are quite prepared to go the length of saying that the pill "contains finely-divided and probably partially oxidized mercury," as Scoresby-Jackson cautiously puts it. Christison goes a little further, though he does not feel quite sure of his ground. "Inquiries tend to show," he says, "that the pills do not contain any oxide, but the reverse may be presumed both from the mode of preparing them and their activity." Proctor, much more positive, very definitely states that "a small portion of the mercury is always oxidized,"

* The length of time required to make grey powder must always be a difficulty in the way of its preparation by retailers. We do know one pharmacist, however, who avers that he can make it in a quarter of an hour!

and, again, "the proportion of oxide in blue pill, even when long kept, is very small." We have not been able to find any authority who holds that mercurial pill contains no oxide; yet our examination of commercial specimens tends to show that this is the more correct view, provided, of course, due care has been taken in the preservation of the pill-mass.

In speaking of grey powder, Proctor says it has been suggested to use sugar in the place of chalk, "but it is not found that sugar in the dry state has any protecting power over the mercury," thereby implying that sugar in the wet state may have such a power. It is somewhat surprising that the "protecting power" of sugar has not long ere this been recognized in the case of blue pill. It is well known that sugar assists certain metals to resist oxidation, and also that its natural tendency is to reduce mercurial salts. This being so, it is singular that the presence of oxide in blue pill should have been so readily assumed in the absence of direct proof, and even, as in Christison's case, in spite of proof to the contrary.

We have examined eight commercial specimens of blue pill-mass, and six of these contained absolutely no trace of either of the oxides. One contained a small proportion of mercurous oxide, but it is noteworthy that this specimen was so dry when it reached us as almost to be in a state of powder, and the percentage of mercury further indicates that it was dry when originally prepared. The other specimen contained traces of both oxides, but it also had been so dry that, before selling it, the pharmacist from whom it was procured had to work it up with a little water.

The following method was adopted for the estimation of the mercury:—

A weighed quantity of the pill is digested in warm strong acetic acid, for the purpose of dissolving out any oxides that may be present. The solution is separated by decantation, and, with the washings of the residue, examined for mercurous and mercuric acetates in the same manner as just described for grey powder. The residue is then digested in dilute nitric acid and filtered, and through the filtrate, which has a yellowish colour owing to the action of the acid on the organic matter, sulphuretted hydrogen is passed to saturation. Excess of nitric acid having been added, the sulphide is separated by filtration, dried and weighed as before.

The colour of the acetic acid solution at once determines whether the pill has been prepared according to the official formula, *i.e.*, with confection of roses, or whether confection of hips has been employed; the solution being of a bright pink or of a dirty-grey to brown, according as the former or the latter has been used. It is exceedingly instructive to note that five out of the eight specimens were prepared with confection of hips. If this represents the ratio of adulteration of pil. hydrargyri throughout the country, it betrays a condition of pharmaceutical morality for which we were not prepared.*

The percentage of mercury found in each of the eight specimens was as follows:—

	1.	2.	3.	4.	5.	6.	7.	8.
Hg per cent. .	37·1	33·6	31.46	41·33	33·62	28·45	35·0	31·5

No. 3 contained 1·32 per cent. of Hg_2O and No. 4 had traces of both oxides; all the others were quite free from oxide. Nos. 6, 7 and 8 were prepared with confection of roses; the others with confection of hips. As showing that the age of the specimen has nothing to do with oxidation, we may mention that No. 1 was more than four years old. The proportion of mercury varies considerably, but in most of the cases this is accounted for by the dryness or moisture of the specimen. Nos. 1 and 7 were moderately dry, and Nos. 6 and 8 were very moist. No. 4 seems to be quite an abnormal specimen, as it was moist rather than dry, though the amount of mercury would indicate a very dry pill mass indeed.

Unguentum Hydrargyri.

Considerable differences of opinion exist regarding the oxidation of the mercury in blue ointment, some authorities believing that oxide is always present, either as such or combined with a fatty acid, others that the mercury is in a finely divided condition only. Of the latter we may cite Pereira, and the author of the article on "Mercurial Ointment" in Cooley's 'Cyclopædia,' who states that "the mercury exists entirely or nearly so in the metallic state, and not in the form of oxide as was generally assumed. The oxide present at any time in the ointment is variable and accidental" Christison, on the other hand, thought that "mercury must be present in the form of oxide combined with a fatty acid," but his opinion was founded on the results of an experiment which was not conclusive. The majority of those we have been able to consult agree in the main with Christison, though it is also admitted that "the mercury is only oxidized to a very small extent" (Proctor).

Our investigations tend to show that, as a rule, the mercury in blue ointment exists in the metallic condition, although oxide is occasionally present, either as such or combined with one of the fatty acids. Of twelve specimens examined, seven were quite free from oxide or oleate, two had traces of oxide, and four contained small proportions of oleate.

The following method was employed in the separation:—

A weighed quantity of the ointment is repeatedly treated with ether in order to remove the fat. The residue is digested with strong boiling acetic acid, which is decanted on cooling. The boiling causes the mercury to run together, and should any moisture adhere to the globule it is readily removed by means of blotting paper. The whole operation being performed in a tared vessel, the percentage of unoxidized mercury is at once ascertained. Any oxides that may be present in the acetic acid solution are estimated in the manner already described, and oleates are detected by passing sulphuretted hydrogen through the ethereal solution, oleate of mercury being slightly soluble in ether.

It is necessary to guard against being misled in the later stages of the process, by the presence of iron in the ointment. We have found distinct traces of that metal in several of the specimens, and this is why we cannot take as thoroughly conclusive Christison's experiment of passing sulphuretted hydrogen through an ethereal solution. It is quite possible that iron may be introduced accidentally during the preparation of the ointment, and care must therefore be taken that its sulphide be not mistaken for the corresponding compound of mercury. This is readily accomplished by ascertaining whether the black precipitate is or is not not soluble in nitric acid. The following are the detailed results:—

	Unguentum Hydrargyri Fort.								Ungt. Hyd. Mit.			
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Hg per cent.	38·0	39·0	40·31	40·14	44·0	44·5	46·1	46·5	13·5	13·48	10·0	10·5

Nos. 5 and 6 each contained a trace of oxide, and Nos. 7, 11 and 12, traces of oleate. No. 6 contained 0·6 per cent. of oxide combined with a fatty acid. Some of the specimens were quite rancid, but most of them were tolerably good in this respect.

Our conclusion regarding the condition of mercurial ointment is that, as a rule, the mercury exists in the metallic state, though oxide, either as such or combined with a fatty acid, may be present. The method of pre

* Out of mere curiosity we turned up the price lists of several of the wholesale houses from which we knew some of the specimens had been obtained, and we found that without exception the quotations for the sophisticated article were from 3*d.* to 5*d.* per pound under the prices charged for the genuine, but as the cost of confection of roses is nearly double that of confection of hips, it is clear that the careless, if not unscrupulous vendors, are able to undersell their more honourable rivals, and at the same time pocket a larger profit!

paration, rather than atmospheric influences, would seem to play the principal part in any change undergone by the mercury.

The strength of the specimens varies very considerably. This might be accounted for by the mercury settling to the bottom of the pot, assuming that the whole had been melted, but in that case we would have naturally expected some of the specimens to give much higher results. If prepared according to the British Pharmacopœia, the ointment ought to contain 49·5 per cent. of mercury, but it does not appear that "ungt. hyd. fort." is at all synonymous, in the opinion of many wholesale dealers, with "Ungt. Hyd., B.P." Cooley states that "the ungt. hyd. fort. of the wholesale houses is generally made of mercury, 12 lbs., suet, 1½ lbs. and lard, 16½ lbs.;" consequently the ointment contains only 40 per cent. of mercury. If this statement is correct, the low percentage in some of these specimens is readily explained.

Unguentum Hydrargyri Mitius seems to be prepared according to varying formulæ. The usual strength is one of strong ointment to two of lard, and such seems to have been the way in which Nos. 9 and 10 had been prepared. The other two, however, must have been one to three, a strength which, to say the least, is somewhat weak, more especially when the ung. hyd. fort. is rather weak to begin with. Some time ago a case was before the courts under the Adulteration Act, where a chemist was charged with selling mercurial ointment containing 16 per cent. of mercury. The case was dismissed, and very properly so, but we question if the same result would have been attained had any of the four samples given above been under discussion.

Without expressing any decided opinion on the results of our investigation, as tabulated in this report, we may be allowed to remark that the care and accuracy which ought to be characteristic of the profession of pharmacy seem, in some cases, to be conspicuous by their absence. It is quite true that preparations in which metallic mercury occurs are more apt to vary than most others in the Pharmacopœia; but this cannot be an excuse for an evidently systematic arrangement whereby a weaker article, as in the case of ungt. hyd. fort., is frequently supplied. Unfortunately, retail pharmacists are not generally in the habit of making their mercurial galenicals, the more common practice being to order these along with the drugs. The majority of pharmacists thus deliver themselves, so to speak, into the hands of the manufacturers, and where there is little opportunity, and probably less disposition, to be critical, there is no wonder that things are not always kept up to the correct standard.

The PRESIDENT proposed a vote of thanks to the authors. He said he had heard the paper with a certain amount of dissatisfaction, for, supposing the results were correct, the state of things represented was anything but creditable to pharmacy, and he hoped some explanation would be given upon certain points. It proved the necessity that such bodies as the Conference and the Pharmaceutical Society should be unceasing in their efforts to promote a high standard in pharmacy.

Mr. SCHACHT said there was a good deal in the paper which deserved attention. Pharmacists ought to be able to receive any amount of criticism on the way they conducted their business, at the same time, although the Honorary Secretary had not read the whole of the paper quite literally, some of the strictures might not be altogether deserved. It appeared to him that grey powder was one of those preparations which it would be highly desirable that chemists should, as far as possible, make themselves, and not leave to the wholesale gentlemen to prepare for them; for this reason. It had been declared publicly by preparers of grey powder in large quantities that it was done by a mechanical process, which their large establishments enable them to accomplish with economy of labour. A large quantity of material was put into a tub into which was introduced a boulder, and the whole was fixed on to a piece of machinery and made to revolve for an indefinite length of time. Now it stood to reason that an element like mercury, which had an affinity for oxygen, was there placed under favourable circumstances for effecting combination, and although the product at the end of the process might be a wonderfully finely divided metal, a fineness of division which he believed the authorities did not declare to be necessary, there was great risk of getting some portion of the finely divided mercury converted into oxide. This was an article he was a little special about, and he recommended dispensing pharmacists to prepare it themselves. It only required a small amount of labour to make a moderate quantity, and if their experience were like his, namely, that the use of mercurials amongst medical men was rather less than it used to be, a moderate quantity would last a long time. Notwithstanding that this principle had been long adopted in his own establishment, he had to confess that a short time since he had examined his own stock and found it to contain distinct traces of oxide. It had been of course immediately thrown in the dusthole, and a fresh quantity made. It was quite possible a similar mischance might occur to others who were innocent of any intention of having anything but the most perfect article in their possession. Although they were open to criticism, critics should be extremely careful, and when the authors gave as the result of an investigation the exact quantity of mercury traceable in mercurial ointment it was rather unfortunate they should have omitted altogether that which he was bound to admit might occur, a possible combination of a part of the mercury with the fatty acids. They stated what was found in the shape of mercury proper and oxide of mercury, but appeared to have overlooked that mercury in combination with fatty acid might be perfectly soluble in ether. He separated the fat, and he separated the ether, but he might have carried away a lot of mercury in combination with the fat. Some years ago whilst experimenting with nitrate of mercury ointment he found a large proportion of mercury there had passed into combination with the fat and that the compound was soluble in ether. Therefore Mr. Maben had scarcely done justice to pharmacists in the determination of the amount of error which existed in the ointment. With regard to blue pill, he had not attacked the subject lately, but he strongly recommended general dispensers to make their own grey powder.

Mr. PLOWMAN said he had only read an abstract of the paper; but he had stated that the authors recognized the fact that oleate of mercury was soluble in ether. With regard to the pilula hydrargyri, it was a subject he had not practically investigated himself, but he remembered being present at an evening meeting of the Pharmaceutical Society when Mr. Harold Senier read a paper on the composition of pilula hydrargyri, in which the author stated he found very distinct quantities of the oxides of mercury, and his experiments clearly pointed to the fact that the amount notably increased with age. He believed that in one freshly prepared specimen Mr. Senier found no oxide, but in one a little older he found it, and it increased as time progressed. In the discussion which then ensued Professor Redwood rather took an opposite view, and thought with Mr. Schacht that the making of these preparations by machinery had a considerable influence on the proportion of oxide, especially in hyd. cum cretâ, and that if the pharmacist made it himself the proportion of oxide would not be great. Mr. Bottle some years ago advised the pharmacist to make hyd. cum cretâ himself by putting the ingredients in a bottle, and shaking them, and stated that in this way the mercury might be "killed" in a very short time.

Mr. TYRER said this subject of the mechanical compounds of mercury had great interest for him. He was inclined to agree with the general conclusions of Mr. Schacht and Mr. Plowman, but he also thought the manufacturers and wholesale houses had been rather

strongly dealt with. As one of that unfortunate class he felt himself somewhat courageous in defending them; but he had had opportunities extending over twenty-five years in the manufacture of these things, especially the former and the latter, and had made it his business as a chemist to examine the conditions under which they were produced, and make careful analyses of the results of the conditions immediately after the operation had been ended, and at various stages. He might parenthetically observe with regard to some of the papers read that much of the work done at meetings of this kind reminded him that the element of time was one which no manufacturer should omit to take account of. With regard to the oxidation of grey powder, he knew no difference between the result of working in the old-fashioned method on a large scale with a large mortar and pestle, and working on what might be called the economic manufacturing scale. With reference to hyd. cum cretâ, immediately after the preparation on what may be called a large scale by the old method, and still larger scale by the new method, there would be found no difference; but in a month a difference would be perceptible, and in three months still more, and so on until a point was reached when the oxidation ended, though what that point was he was not prepaired to say at the moment. He had examined a specimen twenty years old to see what the amount of oxidation would be under those conditions and other specimens down to some made within the last week. There were two modes of preserving specimens. When he was a student at the old College of Chemistry he remembered Dr. Hofmann used to say, "See how much you can vary the conditions," and that remark in his case did not fall on barren soil; he thought there was a great deal in it. He had observed the difference in samples of hyd. cum cretâ which were practically hermetically sealed and those which were exposed to light and air, and he found the difference with the very same sample was as great as it was possible to conceive. Therefore, he suggested that in putting up hyd. cum cretâ in paper the process of oxidation might be facilitated. One suggestion occurred to him, therefore, that in making hyd. cum cretâ it should be put up in the smallest size bottles, but manufacturers were obliged to do as they were told or lose their business. Still there was no reason, if grey powder deteriorated, unless it were put up in the smallest quantities consistent in something like practicability, why that method should not be adopted, but of course the trouble must be paid for. If Mr. Schacht's advice were followed, it would be a serious matter, and it was well deserving attention from an economical as well as pharmaceutical point of view. But he rose to say for his firm and other manufacturers that they would be exceedingly weak if they did not attempt at once to try and secure to themselves the *prestige* they had been working hard for—in fact to secure their business, and put it out of the range of possibility of gentlemen of ability in conducting such researches to pass such strictures at all. The question of the fatty compound oleates was one which deserved even fuller notice than it had at the hands of the authors in their account of the ointments. With regard to the discussion that morning on lard, he thought Mr. Naylor's point on rancidity was more important than it seemed to be regarded. If lard were rancid it would be acid as a rule, and one got a condition in making up ointments never contemplated by the physician. With regard to what might be called the mechanical methods of producing these things, he was old-fashioned enough to believe there was nothing like working with a diligent strong arm; but patience, care, and the exclusion of human infirmity were involved, and these were never all obtained. Some people said that in modern days the British workman was more careless than ever he was; but at any rate one way of avoiding in the highest degree the probability of human error was to have the best mechanical appliances, and it would be a poor thing in these days if one could not have mechanical appliances which would produce any required result. With regard to the quantities of mercury found he was simply astounded, and the differences involved could not be accounted for by oxidation or rancidity, and must be due to an evasion of the provisions laid down for the preparation of those articles. If a man asked for a preparation he should have it. As a manufacturer, he felt the honour and respectability of deserving and well intentioned manufacturers were discounted by the acts of persons who perhaps did not carry their honour at the right place. A mixture of, say, "brickdust" with preparations was not allowable by law and should, most distinctly never be sent out. It was said if there was no demand there would be no suppliers. Of course if no one asked for these things there would be nobody to supply them; but if manufacturers, said one and all, "No, we will not supply sophisticated goods," that would be the proper course of action. This was suggested to his mind by the weaker ointments. He had not read Cooley for some time, but he was reminded that in old days in ninety-nine cases out of a hundred when ung. hyd. was asked for it meant ung. hyd. fort. As to what should be understood as being intended by the weaker ointment, as there was no recognized form it was probably an open question; but certainly if a compromise were made 16 per cent., which was practically in round numbers $\frac{1}{6}$th, was low enough for any weak ointment. He had not had the same experience with regard to the pil. hyd. The authors of these papers in analysing all these compounds of mercury had used methods accurate and reliable, and which could be practised behind the counter of any pharmacy, and he did hope that in any future pharmacopœia the tests would be such as might be applied by men of reasonable ability and practical capacity and experience. Pharmacists would be glad of this very simple method of distinguishing between pil. hydrarg. made with the "hips" and those made with confection of roses.

The PRESIDENT said they were all much indebted to the authors of this paper dealing with a subject of primary importance. They all knew what a serious matter the presence of the hydrargic or per-compound was, and Mr. Schacht had pointed out that if oleates were formed they would only be formed with per-salts, and not proto- salts, and that it would be really making a per-salt more effective for mischief than it would be by itself. Altogether he must, as President, express a very strong feeling of astonishment that it should be possible for such papers to be written, and he should like to have some explanation as to the conditions and circumstances under which these samples had been obtained.

The following papers were then read by the Secretary:—

On Iodine in Cod Liver Oil and other Marine Products.

BY EDWARD C. C. STANFORD, F.C.S.

In a paper on this subject read before the Pharmaceutical Conference at Southport, last year, I found the proportion of iodine in cod liver oil to be much less than the results published by other observers.

Taking the average of six samples from different sources, I found them to vary from ·000138 per cent. to ·000434 per cent., the average being ·000322 per cent. The amount contained in the fresh liver was more than twice as much, ·000817 per cent. Since then I have had the opportunity of examining two genuine samples, of which I know the origin, with the liver from which these have been extracted; one was sent me by Mr. Gale, of Messrs. J. Bell and Co., and the other was made by myself. I obtained 14 ounces of oil and a little water from 2½ lbs. of liver. All were examined for iodine with the following results:—

	Per cent.
Cod liver oil, Gale, filtered	·000040
„ „ „ „ unfiltered . . .	·000052
„ „ „ „ marc	·000200
„ „ „ Stanford	·000077
„ „ „ „ marc . . .	·000765
„ „ „ „ water . . .	·000680

I think, therefore, from the analyses of these oils of known origin, we are justified in the conclusion that iodine has little to do with the therapeutic value of the oil.

Oysters.—It is commonly supposed that these delicious esculents are rich in iodine. The Anglo-Portuguese variety has been specially reported on. These oysters are obtained from about thirty miles of coast extending from Lisbon to Cacillias Point, and are nursed and fattened in England.

Dr. Champouillon, of Paris, published a report on these oysters in 1876, from which the following is an extract:—

"Oysters fattened on the English coast and submitted to the same analytical processes are found to be far less rich in iodine and bromine than those of Portugal. These latter, owing to their special constituents, represent a valuable dietary article of a nature to prevent scrofula, ganglionary gathering, rachitis and perhaps also phthisis, among classes condemned to physiological misery by the very conditions of their existence. The Portuguese oyster deserves therefore to engage the attention of medical men."

He found that 1 kilo gave 760 grams of water and ·039 gram of iodine, and ·062 gram of bromine or iodine ·0039 per cent. and bromine ·0062 per cent. My attention was called to this report at Southport, and I took some trouble to secure a supply of genuine Anglo-Portuguese oysters. The amount of iodine found was ·00004 per cent. or 4 parts in ten millions. Whatever, therefore, may be the value of oysters in the maladies alluded to above, we may be permitted to doubt if any of these advantages are due to the iodine contained therein.

Sponge.—Spongia usta, or burnt sponge, was long used as a medicine, and was formerly official in the Dublin Pharmacopœia. According to Pereira, it was employed "as a resolvent in bronchocele and scrophulous enlargement of the lymphatic glands. Its efficacy is referable to the presence of iodine and bromine." The tests employed show that the iodine was the element required in it.

Herberger found in it, iodide of potassium, 1·16 per cent. = iodine, 0·887 per cent.; bromide of potassium, 0·702 per cent. = bromine, 0·48 per cent. and traces of copper.

Preuss found, iodide of potassium, 2·14 per cent. = iodine, 1·636 per cent., and bromide of sodium, 0·76 per cent. = bromine, 0·59 per cent.

Posselt found 3·59 per cent. of ash.

Croockewit found 3·7 per cent. of ash and 1·09 per cent. of iodine, also 0·50 per cent. of sulphur and 1·90 per cent. of phosphorus.

I am indebted to Mr. D. Frazer, of Glasgow, for a supply of fine sponges, and I append the results of analyses of these.

	Fine Turkish.		Honeycomb.	
Water	19·40		19·40	
Organic matter . . .	69·39		50·24	
Ash soluble in water .	2·21	Ash, 11·21	3·70	30·26
Ash insoluble in water	9·00		26 66	
	100·00		100·00	
Iodine	·200 = 4·48 lbs. to ton		·054 = 1·2096 lbs. to ton	
Iodine on sol. salts	9·050		1·460	
Per ton of salts .	202·7 lbs.		32·7 lbs.	
On the total ash .	0·1779 per cent.		1·7841 per cent.	
Per ton of ash .	4 lbs.		39·96 lbs.	

The salts contained only a trace of potash, as free alkali, chloride of sodium and sulphate of lime. Turkey sponge is therefore very rich in iodine, but its value per lb. is unfortunately about twelve times that of iodine. The insoluble ash is principally sand. I hope to give some further details of this ash later on. The sponge was carbonized and the salts extracted from the charcoal. I have shown in a former paper, that the iodine is rapidly volatilized when an organic compound containing it is burnt to complete ash, especially in the presence of silica. I will only add that it will afford me much pleasure to examine any home grown sponges or other marine products that may assist our knowledge of the distribution of iodine, if any of our members who reside near the sea will favour me with samples of not less than 5000 grs.

The next paper read was entitled—

Proximate Analysis of the Rhizome of Alpinia Officinarum (Hance).

BY DR. THRESH.

Until very recently all that was known of this drug was that its odour was due to a volatile oil, and that it contained a crystalline body, which had been discovered and imperfectly examined by Brandes (*Archiv Pharm.* (2) 19, 52). In 1881, Jahns published in the *Berichte* the results of his examination of Brande's 'Kämpferid.' He found that, together with this body, galangal rhizome contained two other closely allied bodies, which he named "galangin" and "alpinin" respectively. My object in studying the chemistry of the drug was to isolate the pungent principle; but as at the same time it seemed advisable to ascertain the nature of its other proximate constituents a number of experiments were made with that object, and the results are now recorded.

Ash.—1·198 gram left a grey-brown ash weighing ·0461; or 3·85 per cent. Like the ash of most other members of the order *Zingiberaceæ* it was rich in manganese.

Moisture and Volatile Oil.—Dried at 110°, 1·985 grain lost ·287, and 1·837 lost ·262, or 14·5 and 14·3 per cent. respectively.

Petroleum Ether Extract.—The petroleum ether residue corresponded to 2·7 per cent., of which ·6 per cent. was volatile. After removal of this volatile portion the residue no longer dissolved completely in petroleum ether. The insoluble portion was soft and resinous, soluble in warm S.V.R., in acetic acid, ether, chloroform, and solution of potash. Only slightly soluble in ammonia, carbon disulphide and benzol. The alcoholic solution was neutral, darkened by Fe_2Cl_6, and precipitated copiously by Ba2HO. Lead acetate gave a granular yellow precipitate soluble in boiling alcohol. The weight of this insoluble portion = ·375 per cent. of the rhizome.

A portion of the petroleum ether extractive was insoluble in rectified spirit. It also was a soft brown resinous matter, soluble in petroleum ether, benzol, and carbon disulphide, but not in aqueous or alcoholic solution of potash. Quantity ·154 per cent.

The remainder of the petroleum ether extractive consisted of a mixture of fat and active principle. By dissolving in petroleum ether and shaking with 50 per cent. alcohol, the active principle is taken up by the spirit. The ether when evaporated leaves a residue of pale brown soft transparent fat, insoluble in acetic acid, and only slightly soluble in warm S.V.R. After saponification the fatty acid dissolved in spirit, and was precipitated by zinc, barium, lead and copper salts, but not by magnesium salts. The alcoholic solution of the fat did not reduce ammoniacal silver nitrate. The fat itself has an exceedingly disagreeable and persistent taste.

The Active Principle, Galangol.—Upon evaporation of the alcohol solution a semi-fluid pale yellow residue remained. It was very pungent, easily soluble even in dilute alcohol and in solutions of the fixed alkalies. It did not dissolve in ammonia, and its alcoholic solution was not precipitated by lead acetate and ammonia. By boiling the alcoholic

solution with a little silver nitrate and ammonia, the tube becomes coated with a metallic mirror, but the reduction is not so readily effected as with the active principles of ginger or grains of paradise. Further information with regard to this body will be found in my paper on the "Pungent Principles of Plants."

Exhaustion with Ether.—The galangol which had been exhausted with petroleum ether was next treated with dry ether. Upon evaporation of the ethereal solution a brown-black pulverulent residue was obtained corresponding in weight to 2·25 per cent. of the original drug. Of this ·1 per cent. was matter which had previously escaped the action of petroleum ether.

This residue is of an exceedingly complex nature. It contains—

(*a*) Kämpferid, galgangin, alpinin, and probably other bodies, soluble in dilute solution of sodium carbonate and in alcohol, and precipitated from the latter solution by lead acetate. On decomposing the lead precipitate, etc., these substances are easily obtained, in form of minute sulphur-yellow coloured crystals.

(*b.*) Other crystalline bodies, closely resembling the above, but not precipitated by lead acetate.

(*c.*) A small quantity of a black, resinous matter, insoluble in sodium carbonate solution.

Alcoholic Extractive.—This contained a tannin (giving a green colour with ferric salts), glucose, phlobophane, and other substances not recognized.

Aqueous Extractive.—After exhaustion with alcohol the powder yielded to water a slightly acid, red-brown infusion, containing glucose, oxalic acid, mucilage, colouring matter, etc. The infusion is rich in oxalates.

After extraction with water, the residue was treated successively with ·2 per cent. soda solution, 1 per cent. hydrochloric acid, and finally in the residue the *starch* was estimated. The alkaline solution evidently decomposes some constituent of the plant, for it yields a deep red solution, which is not precipitated by addition of either acetic acid, or alcohol. Sulphuric acid, however, throws down an abundant precipitate of red-brown flocculent matter, leaving the supernatant solution nearly colourless. The precipitate was collected, dissolved in a little dilute ammonia, and reprecipitated by hydrochloric acid. It dissolves in solutions of the alkaline hydrates and carbonates, and is precipitated from these solutions by mineral acids, but not by acetic acid. It dissolves in alcohol, and this solution, when diluted with water, does not become turbid, but precipitates with barium, calcium, silver and lead salts. It only slightly reduces Fehling's solution, even after prolonged ebullition with dilute acids. The yield of this "galangal red" corresponded to 2·8 per cent of the rhizome.

The albumenoids were determined from the amount of ammonia yielded on combustion of the powdered rhizome with soda lime.

A tabulated result of the analyses is appended.

Volatile oil	·6	Sol. in P. ether 2·33
Resin	·15	
Fat and Galangol	1·58	
Kämpferid, etc., precipitated by lead acetate	1·44	Sol. in ether 2·62
Crystalline matters not precipitated by lead acetate	1·18	
Tannin	·56	
Phlobophane	1·22	
Glucose	·98	
Oxalic acid	·32	
Mucilage, etc.	2·55	
Galangal red	2·80	
Starch	23·7	
Albumenoids	2·55	
Moisture	13·8	
Ash	3·85	
Cellulose, etc., by difference	40·72	
	—100·00	

The next paper was a—

Note on Sulphurated Lime.

BY T. S. DYMOND.

This note is the result of a few experiments made to determine which of the processes that have been suggested or employed for the production of sulphurated lime is the best.

Process I.—One hundred parts of lime in fine powder was mixed with 90 parts of precipitated sulphur, the mixture was gently packed in an earthen crucible, and the lid luted on. The crucible was now heated for one hour in a charcoal fire at a low red heat, the heat being applied to the top first and gradually continued downwards. The sulphurated lime was cooled and rubbed to a powder.

The resulting substance was brown in colour, and had a faint peculiar odour, somewhat resembling sulphuretted hydrogen, but distinct from it. It contained about 30 per cent. of sulphide of calcium.

This was estimated in the following way,—1·25 grams of sulphate of copper is dissolved in 50 c.c. of water. To this solution, kept acid with a little hydrochloric acid, the sulphurated lime is added, and the mixture is heated nearly to boiling. When all the sulphurated lime is decomposed, a little of the filtered liquid is tested with ammonia for copper. If the liquid becomes blue, the mixture is cooled, a little more of the sulphurated lime is added, and the process repeated as before, till all the copper has been precipitated from the solution. From the amount of the sulphurated lime which has been found necessary to decompose 1·25 grams of sulphate of copper, the percentage of sulphide of calcium may be easily calculated.

Process II.—Sulphuretted hydrogen was passed through dry slaked lime for eighteen hours. The resulting substance was of a light green colour, and had an unpleasant odour similar to the odour of that prepared by Process I., but more resembling that of sulphuretted hydrogen. It contained 5·7 per cent. of calcium sulphide.

Process III.—Sulphuretted hydrogen was passed through slaked lime made into a paste with water, for eighteen hours. The colour of the resulting body was dark green, but on heating to redness changed to a light pink colour. The smell was similar to the smell of that prepared by Process I., but not so strong. On adding acid sulphurous vapours were given off, indicating the presence of a sulphite. It contained 6 per cent. of calcium sulphide.

Process IV.—Seven parts of finely powdered sulphate of calcium was thoroughly mixed with 1 part of wood charcoal, also finely powdered, and the mixture heated in an earthen crucible at a red heat till the black colour had disappeared. Allowed to cool.

The resulting sulphurated lime was of a light pink colour similar to the colour of that prepared by Process III., and had a smell like that of the variety prepared by Process I., but stronger. It contained 58 per cent. calcium sulphide.

Reviewing these four processes and their results, the second and third may be at once condemned on account of the greater difficulty of production and the small proportion of calcium sulphide in the sulphurated lime that results. Of the two other processes, No. 4 is the better, for not only do the directions with regard to exclusion of air and mode of heating render the first process more difficult to perform, but the sulphurated lime which results does not contain much more than half the calcium sulphide contained in that produced by the last process, nor is it so elegant a preparation.

That prepared by the action of charcoal on sulphate of calcium will therefore best satisfy producer, prescriber and consumer.

Votes of thanks were passed to the authors on the

motion of the President, who remarked with reference to Mr. Dymond's paper that the important point was that he proved that sulphide of calcium made by means of sulphuretted hydrogen was not the best form for producing a medicinal preparation, and he quite agreed with that view. He had tried various methods, and, as far as his memory served him, his own conclusions very closely approximated to those of Mr. Dymond.

Abstracts of the following papers were then read by the Honorary Secretaries:—

The Estimation of Diastase in Extract of Malt.

BY T. S. DYMOND.

Now that extract of malt has become such a popular remedy, it is necessary to be readily able to determine its value. This depends largely on the amount of diastase the extract contains, and hence this is the substance to be estimated.

There are two processes which have been suggested for this determination, one by Messrs. Dunstan and Dimmock in 1879 (*Pharm. Journ.*, [3], ix., 733), and the other by Mr. Carl Jungk in 1883 (*Pharm. Journ.*, [3], xiv., 104). The object of this paper is to show which of these is the more reliable, and to point out a modification which may be made on the more reliable process to render it more simple and rapid.

The two processes both depend on the power which diastase exerts on starch, first rendering it soluble, and then converting it into dextrin and sugar; but while Messrs. Dunstan and Dimmock estimate the diastase by the amount of malt extract required to effect the conversion of a definite amount of starch in a definite time, Mr. Carl Jungk estimates it by the time taken by a definite amount of malt extract to effect the conversion of a definite amount of starch.

Mr. Carl Jungk's Method.

A mucilage is made of 10 grams of starch in 150 to 180 grams of boiling water. This is cooled to 100° F., and to it is added a solution of 10 grams of extract of malt in 10 c.c. of water, also at 100° F. Keeping the mixture at that temperature, 1 drop is added every minute to successive test tubes full of water, each containing 1 drop of standard solution of iodine, till no coloration is produced in the liquid. A good extract, Mr. Carl Jungk says, should convert its own weight of starch within ten minutes at 100° F.

Four experiments were made in order to try the efficiency of this process, all with extracts of fair average diastasic strength. The following tables give the changes of colour which were observable and the time in which these changes took place:—

Experiment I.

Blue—			
Purplish blue	After	3	minutes.
Purple	„	5	„
Pinkish purple	„	8	„
Brownish purple	„	15	„
Very light brown	„	90	„
Almost colourless	„	120	„

Experiment II.

Blue—			
Purple	After	4	minutes.
Violet	„	6	„
Red	„	12	„
Pinkish yellow	„	18	„
Yellow	„	22	„

Experiment III.

Blue—			
Purple	After	5	minutes.
Pink	„	10	„
Yellowish pink	„	20	„
Light brown	„	25	„
Yellowish brown	„	40	„
Dark yellow	„	4	hours.

Experiment IV.

Blue—			
Purple	After	5	minutes.
Pinkish purple	„	10	„
Brownish purple	„	20	„
Light brown	„	25	„
Yellowish brown	„	3	hours.
Dark yellow	„	5	„

In all cases the solutions were blue after standing for twenty-four hours, and if the iodine solution was added to the flask in which the mixtures of starch mucilage and malt extract solution were placed, a blue colour was produced at once. The conversion of the starch, therefore, was not complete, the disappearance of blue colour being probably due to the brown compound which excess of iodine produces with starch and dextrin, the blue colour asserting itself when the excess of iodine had volatilized. This test, it is clear, gives fallacious results, and cannot be employed for the estimation of the actual diastasic value of extract of malt.

Messrs. Dunstan and Dimmock's Method.

·1 gram of starch is gelatinized with 100 grams of water, and the mucilage is mixed with various quantities of 10 per cent. solutions of the malt extract, and the mixture kept at a temperature of 100° F. for three hours. Iodine solution is then added to a portion of each mixture, in order to indicate to which, just sufficient malt extract has been added to completely convert the starch. The amount of malt extract added to this mixture indicates its diastasic strength in terms of power of starch conversion.

Several experiments were made in order to test the efficiency of this process; they were attended with good and constant results.

The one difficulty in the process is, that in order to determine the value of an extract of unknown diastasic strength, a great number of experiments have to be made, and these take time and space, and much trouble in keeping at a temperature of exactly 100°. Dr. William Roberts ('Proc. Royal Soc.,' xxxii., 151) has suggested a modification of the above method which to some extent meets this difficulty. As the time required to effect conversion of starch into dextrine and sugar by means of malt extract is proportional to the amount of diastase that malt extract contains, he first determines the approximate strength of the extract by the time the conversion takes place, and then the absolute strength in other experiments in the way suggested by Messrs. Dunstan and Dimmock, by these means doing in two or three experiments what would otherwise require six, eight, or even twelve.

It will be found simpler to go still further and alone to determine the time taken by a unit amount of malt extract to convert a unit amount of starch. After several experiments, the following was found to work well:—1·5 gram of malt extract is dissolved in 15 c.c. of water and mixed with a mucilage of ·1 gram of starch in 100 c.c. of water. The mixture is raised to 140° F. in temperature and tested from time to time by adding two drops of iodine solution to 5 c.c. of it, and comparing with 5 c.c. of a similar mixture to which no starch has been added. No difference of tint between the two solutions indicates completion of the reaction. A very good malt extract will accomplish this within half an hour, but many commercial extracts will not do so until nearly three hours. If the reaction is not complete within three hours the extract should be condemned, as it has probably been evaporated at a temperature at which more or less of the diastase has been destroyed.

Report on Commercial Peruvian Balsam and the Methods for ascertaining its Purity.

BY PETER MACEWAN.

The primary object of this paper was to report on the purity of commercial Peruvian balsam (Blue List, sub-

ject 248), but the writer has also commented on the more important tests for the balsam, some of which seemed to require notice.

The high price which the balsam occasionally attains tempts to adulteration, and the crude method of manufacture, so graphically described by the late Daniel Hanbury, favours admixture; this is indeed so much the case that of recent years the balsam has been subjected to a process of purification at the ports of shipment (*Pharm. Journ.*, [3], xiv., 861). Sophistication of the balsam has been more observed on the continent than in this country, probably because it is less used here than there; the effect on the literature of the subject is that the bulk of it has emanated from foreign pharmacists.

Source of the Specimens examined.—Time has limited the number of specimens examined. Altogether twelve are reported on; of these five were obtained from retail pharmacists, four from wholesale houses—all recently stocked,—and three were kindly procured for me by Mr. J. B. Stephenson, through the agency of a London firm. These specimens were obtained from consignments on board ship, and may be taken to represent the balsam as received in this country. A specimen of Myroxylon Pareiræ bark was received from Mr. E. M. Holmes. The writer here expresses his obligations to these gentlemen for their assistance.

Method of Examination pursued.

I. Preliminary Tests.—These are such tests as afford, or are understood to afford, indication of impurity.

A. Specific Gravity.—On this important point our Pharmacopœia is silent, a silence due, probably, to uncertainty. At the time of the publication of 'Pharmacographia,' edit. i., the specific gravity of commercial balsam was from 1·150 to 1·160. Since then it has decreased considerably and in the last edition of the German Pharmacopœia it is given as 1·137 to 1·145, and in that of the United States as 1·135 to 1·150. This decrease is understood to be due to a modification which the balsam undergoes in the process of purification already referred to. Although, therefore, the low specific gravity of recent years "is quite consistent with the purity of a given sample," it should be kept in mind that all known adulterants lower the gravity, so that a determination of this factor is of great importance. It will be observed from the appended table that specimens lower than 1·140 are the exception and that 1·1376 was the lowest. The latter was a very fine specimen, exceptionally rich in cinnamein, and the writer concludes that the minimum of the P.G. and the maximum of the U.S.P., viz., 1·137 to 1·150 at 15·5° C. form fair and reasonable limits, a high maximum being no disadvantage, whereas a low minimum is.

B. Sulphuric Acid Test, U.S.P. — One volume of balsam is rubbed up in a mortar with two volumes of sulphuric acid. When washed with cold water it should form a brittle resinous mass when cold. If fixed oil is present the mass does not harden.

(*Note.*—If the mass be washed with hot and then with cold water, as recommended by O. Schlickum (*Pharm. Journ.*, [3], xiii., 321), it does not harden, even though the balsam be quite pure.)

The test also detects copaiba. Ten per cent. of the adulterant causes little alteration, but 15 per cent. causes evolution of sulphurous acid and white vapour, and as the percentage increases the decomposition becomes more marked.

C. Ammonia Test, P.G. Originated by Dr. C. Grote ('Year-Book,' 1881, 219).—Five drops of balsam shaken up with 3 c.c. of solution of ammonia should give very little froth and should not gelatinize in twenty-four hours. The test is calculated by the originator to detect 20 per cent. of common resin or colophony. For this purpose it is admirably adapted. A balsam containing 7 per cent. of common resin gave an abundant froth (twice as much as the solution), but did not gelatinize; while pure balsam and balsams containing storax, fixed oil and benzoin gave froth amounting to only about one-sixth of the solution.

Using Schlickum's modification of the test the writer failed to get any indication of storax in a balsam containing it.

D. Flückiger's Lime Test (*Pharm. Journ.*, [3], xii., 45).—"Ten drops of balsam shall furnish with 0·4 gram of slaked lime a mixture which remains soft," the mixture being at most "kneadable or somewhat friable, and readily divisible." Whereas Professor Flückiger found that balsams which were adulterated or "to which storax, benzoin (evaporated alcoholic solution), colophony and copaiba balsam were added gave very hard, no longer kneadable, masses." As the writer's results are markedly different from those of Flückiger he gives them here in detail:—

Pure Balsams gave smeary masses which became of a pilular consistence in from six to thirty-six hours, when they became crumbly.

Adulterated Balsams.—Storax, 10 per cent., gave a smeary, sticky paste, which assumed a pilular consistence in two hours, and was brittle and crumbly in six hours. Experiment repeated with addition of two drops rectified spirit gave a smeary paste which became brittle and crumbly in *twelve minutes. In both masses the odour of storax was well marked.*

Copaiba, 10 per cent., gave a very thin paste which dropped off the pestle, but was of a pilular consistence in five minutes, and became brittle and crumbly in an hour. *The mass possessed the distinctive odour of copaiba.*

Colophony, 7 per cent. (alcoholic), gave a mass which became brittle and crumbly in two minutes.

Benzoin, 8 per cent. (alcoholic), became of stony hardness in five minutes.

These results being somewhat unsatisfactory, Grote's modification of the test was tried. The test as given in *Pharm. Journ.*, [3], xiv., 424, is the following:—

"One gram of the balsam is mixed with one or two drops of spirit, and to ten drops of the mixture 0·4 gram of slaked lime is added. If the balsam is pure the mass will not harden; should that take place the sample is adulterated, probably with either storax, benzoin, colophonium, copaiba or tolu."

In the experiments 2½ minims of rectified spirit and 12½ of balsam were mixed; of this mixture 10 minims were rubbed up with 6 grains of slaked lime. Of nine pure specimens so treated seven gave a smeary paste, becoming of a pilular consistence in two minutes, crumbly in from five to twenty minutes, and stony hard in twelve hours. Two of the specimens became crumbly in the mortar, so that when removed they had a scaly appearance. Balsams to which storax, benzoin, copaiba or colophony were added gave the smeary paste which passed through the pilular and crumbly to the stony condition, as the pure balsams did, while the only one which remained permanently soft was that to which 10 per cent. of castor oil had been added.

It thus appears that the test in its original form does not give the results which it is said to afford, copaiba being the only adulterant which gives hardening at all approaching to what might be expected, and it will be gathered from the nature of the experiments that Grote's modified test is neither more nor less than a test for the alcohol added, unless we include fixed oil, which it does not profess to detect. The odours afforded by copaiba and storax indicate their presence in the mass.

Minor Tests.—The B.P. water-test is a rough method of detecting alcohol, which is more readily indicated by low specific gravity, while the benzin test of the U.S.P. readily indicates fixed oil. As benzin, U.S.P., is a petroleum spirit of low gravity and boiling-point, it must not be mistaken for the "benzin" of commerce, which readily affects pure balsam.

II. Action of Solvents.—This method of examination has a more or less definite relation to the constituents of

the balsam, so that while indicating purity to a certain extent a fair idea is also given of the quality of the balsam under examination. Without entering fully into the chemistry of the balsam, which is much in need of careful and thorough revision, it may be stated for convenience sake that it is a mixture of cinnamëin (benzylic cinnamate), one or more resins, styracin (cinnamylic cinnamate) according to Delafontaine, and a small percentage of free cinnamic acid. As in all natural products the proportions of the constituents are not constant, it being, in fact, understood that the resins and free acid increase with age. In common with those who have given attention to this subject the writer considered it important to determine (1) the proportion of the odorous principle (cinnamëin) in each sample, and (2) that of the resins.

1. *Determination of Cinnamëin.*—For this purpose a petroleum spirit of specific gravity 710, and boiling at 60°-68° C., constant 65° C., was selected. This spirit dissolved out in addition to the cinnamein a small percentage of cinnamic acid, but which, for expediency, was not separately determined. A weighed portion of balsam was treated with the solvent until nothing more was dissolved, five volumes to one of balsam being generally sufficient. The solution after careful filtration was evaporated until the loss was constant. The residue from pure balsam was of the colour and thickness of expressed almond oil, and varied in specific gravity from 1·085 to 1·100 (cinnamein being 1·100). The odour was similar to that of pure balsam, but devoid of the peculiar empyreuma. The percentages obtained are recorded in the appended table. It may be convenient to state here that Flückiger and Senier state that pure balsam should yield from two-fifths to one half, while Schlickum gives 41 per cent. as an average. As to the effect which adulterants have on the yield of cinnamein the writer is not prepared to agree with those who have stated that copaiba and castor oil increase it by the weight of them present. The former is certainly soluble in the solvent, but when added to the balsam the relation between the two seems to be broken. Thus 10 per cent. of copaiba was added to a balsam which yielded 43 per cent. of cinnamein, it then yielded 42 per cent. to the petroleum spirit, instead of the theoretical 48·7 per cent. ($43 \times \frac{9}{10} + 10 = 48{\cdot}7$). Schlickum's statement that castor oil is completely soluble in petroleum spirit is based on incorrect observation. One part of the oil is soluble in one part of the spirit, but further addition of the latter throws out the oil. (See 'Year-Book,' 1876, 356). A balsam which yielded 49 per cent. of cinnamein yielded 48·5 per cent. after 10 per cent. of castor oil had been added to it. According to Schlickum it should have yielded 54·1 per cent. ($49 \times \frac{9}{10} + 10 = 54{\cdot}1$). It is evident, therefore, that the *quantitative* estimation of these adulterants, by first treating one part of balsam with the solvent, and then another part after saponification with lime, the percentage of adulterant being calculated from difference in weight of the residues, cannot be correctly effected. But a part of the adulterants passes into solution, so that the method is yet qualitative, and the same holds good with benzoin and colophony (alcoholic solutions), and storax. The petroleum spirit residue is reserved for subsequent examination, the nature of which is commented upon further on.

The portion of balsam insoluble in petroleum spirit was somewhat thicker than the original balsam, and evidently consisted of more than resin; the weight also was so different from the weight of resin separated by bisulphide of carbon that it was thought advisable to treat it with that solvent. This was accordingly done in all cases, the solvent being added until all resin was separated, the clear solution filtered and evaporated. The residue was a pale brown oily body, of the consistence of copaiba, and not unlike it in general appearance. Its odour more resembled storax than pure balsam. An alcoholic solution (which on slow evaporation crystallized to some extent) gave a copious precipitate with basic lead acetate. Treated with strong potash solution (alcoholic) in the water-bath for an hour, much hot water then added and excess of sulphuric acid, brown oily drops were deposited; the deposit was collected on a filter and well washed with hot water. It possessed a powerful hyacinth odour (such as styrone possesses), and dissolved completely in ether, being left on evaporation as a soft brown resin. The filtrate on cooling deposited silvery crystals which were recognized as cinnamic acid. These results lead to the assumption that the residue was composed in part of styracin (cinnamylic cinnamate), which on treatment with strong alkali yields styrone and an alkaline cinnamate, and are merely recorded here for the purpose of throwing a little light on the nature of the substance.

The residue insoluble in bisulphide of carbon was treated with ether, which dissolved nearly the whole of it, what remained being principally woody matter and a little resin soluble in alcohol. The ethereal solution on evaporation afforded a hard brown odourless resin, soluble in alcohol, chloroform and ether. The alcoholic solution gave a precipitate with basic lead acetate. The examination of it has not been extended owing to want of time.

2. *Determination of Resin.*—The method for this determination, which has always been adopted as a convenient one, has been to treat a weighed portion of balsam with three times its volume of bisulphide of carbon. The method was adopted in this case and the results are recorded, but it must be pointed out that the insoluble matter bears no relation whatever to the amount of resin actually present, which is evident on comparing the third and seventh columns of "proportions dissolved by different solvents" in the appended table. According to 'Pharmacographia' as much as 38 per cent. of resin has by this method been found in the balsam; and the U.S.P. has fixed 40 per cent. as a maximum. Schlickum has already pointed out that the resinous residue amounts at most to 16 per cent., and that an admixture of benzoin increases the insoluble portion; the writer's results are corroborative of Schlickum's observation. It is apparent that the U.S.P. has fixed upon too high a maximum, which might be profitably amended, since the test affords a good indication of the presence of benzoin.

In speaking of the petroleum spirit residue, it was remarked that it was subjected to examination. In the German Pharmacopœia it is stated that the residue should not have the odour of turpentine, storax or copaiba, and that it should not give a blue or greenish-blue colour with nitric acid (sp. gr. 1·300 to 1·330). This nitric acid test was designed by Doescher (*Phar. Zeit.*, 1881, p. 238) to detect the presence of storax and colophony. Grote (*Phar. Centr.*, xxiv., 179) finds that he can get the same coloration with the residue from a balsam free from these adulterants. As considerable variance of opinion has been expressed regarding the test, the writer has carefully experimented with it, with the following results:—

1st. If the petroleum spirit solution be not filtered the suspended particles give the green coloration.

2nd. Nitric acid (sp. gr. 1·300—1·330) is quite different in its action from nitric acid B.P. (sp. gr. 1·420).

Using from 10 to 20 minims of the strong acid, placed in a porcelain dish, one minim of petroleum spirit residue being dropped on the surface of the acid, there was obtained in the case of *pure balsam* a pale green coloration *slowly*, the margins becoming violet, which colour darkened; the whole became chocolate brown on standing. *With weak acid the yellow colour darkened or became of an indistinct green.*

Balsam containing storax, a pale green coloration, which darkened to a decided opaque green. The coloration passed from green to brown on standing. *With weak acid coloration same as pure balsam.*

Balsam containing benzoin, coloration same as pure balsam, but violet remained pale and bright, and extended over the surface. *Weak acid gave same as the pure balsam.*

Balsam containing colophony, immediate bright emerald green. *Weak acid gave slowly bright pale green spots on pale brown ground.*

Balsam containing copaiba, intense blue. *With weak acid greenish blue.*

The coloration afforded by benzoin is not sufficiently distinctive to rank as a test; that by storax cannot be relied upon as indicating by itself the presence of the adulterant, as small percentages allow the distinctive violet of the pure balsam to assert itself, but if there be an absence of the violet and the residue have the odour of storax, even in a faint degree, the adulterant is fully indicated. The colorations afforded by copaiba and colophony (or common resin) are exceedingly distinctive.

For the detection of fixed oil in the residue, should such an adulterant be indicated by preliminary tests, it is treated with weak alcoholic potash, gently warmed on the water-bath and filtered, any oil present is thus saponified and renders the filtrate quite milky; if a portion of the filtrate be acidulated with hydrochloric acid there separates out in addition to the cinnamic acid minute oily globules, which float on the surface of the liquid. The soap may be also separated with saturated solution of common salt, and decomposed by acid in the same way. One specimen of balsam, part of a very old stock, gave an abundant separation of oily globules after the residue was saponified and acidulated. It also gave a permanent soft paste with the lime test (alcoholic). None of the specimens reported on contained fixed oil.

In the appended table specific gravities, percentages of cinnamein and resin are recorded, together with the proportions of matter taken up by carbon bisulphide alone, and after the balsam has been treated with petroleum spirit. These are not detailed as being direct proof of the quality of the balsam, but they tend to contrast the quality of the balsam so far as the cinnamein content is concerned, thus, a balsam containing 42 per cent. of the odorous principle is good, but one containing 50 per cent. is better. It is noteworthy that the analogy between low specific gravity and high cinnamein content is fairly well marked throughout, a circumstance to be expected from the specific gravity of the cinnamein, and another proof of the remark that "the low specific gravity of recent years is quite consistent with the purity of a given sample" (*Pharm. Journ.*, [3], xiv., 861).

No.	Source.	Sp. gr. 15·5° C.	Proportions Dissolved by different Solvents.							
			Petrol.spt.	CS_2.	Ether.	Insoluble.	Total.	With CS_2 alone.		
								Soluble.	Insoluble.	Total.
1	Retail pharmacists.	1·1456	46·49	37·66	11·45	4·40	100·00	86·23	13·50	99·73
2		1·1476	36·40	33·97	27·48	1·94	99·19	76·61	23·05	99·66
3		1·1440	44·54	29·02	24·45	1·99	100·00	87·00	13·83	100·83
4		1·1434	41·58	35·49	23 10	0·47	100·64	89·43	10·37	99·80
5		1·1400	48·71	25·78	24·35	1·57	100·41	87·57	11·63	99·20
6	Wholesale houses.	1·1376	52·54	32·40	12·50	2·31	99·75	89·80	10·90	100·70
7		1·1412	50·63	27·87	21·27	0·53	100·30	90·65	9·34	99·99
8		1·1452	43·57	29·28	22·61	3·70	99·16	90·00	10·00	100·00
9		1·1456	43·20	31·00	24·40	1·50	100·10	89·46	11·31	100·77
10	Shipboard.	1·1420	49·18	25·94	22·97	1·48	99·57	88·67	10·63	99·30
11		1·1412	47·18	31·92	19·20	1·55	99·85	90·29	9·55	99·84
12		1·1416	43·23	37·50	17·09	1·91	99·73	89·18	9·91	99·09

Of these specimens all but Nos. 2 and 3 were above suspicion. No. 3 had been some years in stock, so that age would account for inordinate thickness which it possessed and the high percentage of resin. It failed to respond to the tests for impurities. No. 2, on the other hand, was a rather thick and muddy-looking balsam, which could scarcely pass as pure to the observant eye. The petroleum ether residue had a faint odour of storax, and when a portion of the specimen was rubbed up with lime the specific odour of Peru balsam was quite covered by that of storax. As the mass which it yielded with sulphuric acid dissolved completely in ether, Schlickum's method for estimation of the percentage of storax present could not be tried. It is noteworthy that though this is the only impure specimen examined, yet its specific gravity is the highest. This appears anomalous, and can only be explained on the supposition that the specimen was very old.

In concluding, the writer has simply to state that the present supply of Peruvian balsam is of good quality, as far as he has been enabled to judge from the specimens obtained, and according to the method of examination adopted.

(*To be continued.*)

Parliamentary and Law Proceedings.

Herbalists' Saffron.

At Fenton, Staffordshire, on Friday, the 12th inst., before H. C. Greenwood and J. F. Wileman, Esqrs., Samuel Bowers, herbalist, Longton, was charged with selling saffron that was not of the nature and quality demanded, on August 16.

On the day named a woman, acting under instructions from the inspector under the Food and Drugs Act, visited the defendant's shop and asked for threepennyworth of saffron. When she said that it was bought for the purpose of analysis, he said she had not asked for saffron, but savin. She explained that not only had she asked for saffron, but she had handed him a paper with "saffron" written upon it. He denied that she had done so; but the paper was afterwards picked up off the floor.

The certificate of the public analyst stated that the article sold was not the produce of the *Crocus sativus*, but was the young shoots of a savin-like plant, though not the true *Juniperus Sabina*.

The defence was that the article sold, though not the saffron of the chemist, was the saffron of the herbalist, and had been known by that name many years before the foreign article was sent to England.

The case was adjourned till October 24, to enable the defendant to bring proof of his statement.—*Staffordshire Sentinel.*

Poisoning by Carbolic Acid during Medical Treatment.

An adjourned inquest was resumed on Monday, the 8th inst., at the Town Hall, Bridgwater, on the body of Robert Chedzey (17), who died suddenly in the surgery of Mr. Henry Brook. The diseased was taken there by his father suffering from a sore throat, which Mr. Brook found, on examination, to be badly ulcerated. He first tried to touch the ulcers with a camel's hair brush dipped

in a solution of carbolic acid; but could not do this effectually, and he then injected more of the solution, afterwards attending to another patient. A few minutes after he found the deceased in a swoon and insensible. He ran for another medical man, and on returning with him found his patient a corpse.

Dr. Parsons detailed the result of a *post-mortem* examination, expressing an opinion that death had resulted from poisoning by carbolic acid, and this was confirmed by Mr. Stoddart, city analyst at Bristol, who analysed the contents of the stomach.

Mr. Brook stated that the opinion he formed was that the deceased was suffering from diphtheria, and the solution he used was in accordance with a formula given in Squire's 'Medical Companion,' a standard work.

The Jury returned a verdict of "Death by misadventure," and exonerated Mr. Brook from all blame.—*Weekly Mercury.*

Obituary.

JOHN HILDITCH EVANS.

We have to report the death of Mr. John Hilditch Evans, J.P., which occurred at his residence, Bryn Issa, Pershore, Worcestershire, on the 5th inst., in the 70th year of his year. Mr. J. Hilditch Evans was formerly a Member of the Pharmaceutical Society, and for many years a partner in the firm of Evans, Lescher and Evans (now Evans, Lescher and Webb), 60, Bartholomew Close, E.C., and of Evans, Sons and Co., Liverpool. He was well known in Mincing Lane and on the Royal Exchange, where he was highly respected. He retired from business in 1870, and has since resided at his residence at Pershore. He leaves a widow to mourn his loss.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Quinidine in Cinchona Bark.

Sir,—Those of your readers who are interested in quinology, and especially in high percentages of quinidine, to which Mr. Hooper, the recently appointed Quinologist to the Government plantations in Madras, called attention in his paper at the Pharmaceutical Conference, will do well to refer to a series of analyses of Neilghery bark, made here for the Madras Government in 1881. This report (Government Order, No. 1105, July 25, 1881), was published in full in the *Tropical Agriculturist*, vol. i., p. 319, and from it it will be seen that the percentage Mr. Hooper quotes as the highest yet observed in any bark, viz., 1·99, was several times exceeded, in one instance as much as 3·45 per cent. being found.

Stratford. John Hodgkin.

[*** At page 897 of vol. xiii. of the present series of this Journal there is a report of an analysis of a bark showing as much as 4·07 per cent. of quinidine, and in a sample of Indian bark analysed by Dr. Paul in 1882, the quinidine amounted to 2·17 per cent.—Ed. Pharm. Journ.]

Permanganate of Potash Pills.

Sir,—I think the above prepared, as your correspondent last week suggests, with yellow wax as an excipient will not be disintegrated in passing through the human system. Yellow wax is not readily digested, and it requires a temperature of 150° F. to melt it—much above that of the human body.

Wm. Martindale.

10, *New Cavendish Street, London, W.*

Sir,—Nearly two years ago I was asked by a medical practioner to prepare a few permanganate of potassium pills for trial. After a little consideration the method recommended by Mr. Ryley was adopted with fairly satisfactory results.

In reply to a query put at a meeting of the Edinburgh Chemists' Assistants and Apprentices' Association, a few weeks afterwards, I described the process which I had adopted. Mr. Ryley's suggestion is, therefore, not new.

On the publication of Mr. Martindale's formula in the *Pharmaceutical Journal*, I at once tried it and found it so much superior in every respect, that it was at once adopted and has since been uniformly adhered to.

The pills made with wax do not disintegrate so rapidly as those made with ung. kaolin. The wax also undergoes oxidation at the expense of the permanganate; the heat required to soften the former being objectionable on the ground that it favours such a reaction.

It is unnecessary, moreover, to keep a stock of the pills ready made when ung. koalin is used. The excipient can be kept always at hand, and the manipulation is so easy and expeditious that they may be conveniently made as required.

Considering the practical difficulties in the way of preparing permanganate of potassium for administration in pilular form I think Mr. Martindale's process is about as near perfection as can be attained. It is certainly preferable to the "clumsy troublesome form" in which cera flava is the excipient.

24, *N.W. Circus Place, Edinburgh.* John R. Hill.

Sir,—Mr. E. Ryley, in the Journal for September 6, writes that he in making the above pills, after having had only partial success with various excipients, at length found comfort and perfection in beeswax. But on one important point his letter gives no information. What was he trying to do? Was he striving for insolubility? If so with the exception of gutta percha, I think he has hit upon the best possible substance. I have never found Mr. Martindale's vaseline excipient either troublesome or clumsy, as I always keep some made ready for use. Such a thing as conf. rosæ would be troublesome if one had to make it fresh every time one had need to use it for ordinary pill making. Since reading Mr. Ryley's letter, I have made a number of experiments with the result that I find the wax pills insoluble.

I made some of the pills on the 6th and varnished them. I kept one of them suspended in water for six hours at a temperature of 100° F., with the result that most of the permanganate dissolved out, the wax of course keeping the pilular shape. I have tried the same experiment daily since, but cannot get the same result, as they are now quite insoluble and give up none of the permanganate, even when the varnish is slightly scratched off.

Pills made with the vaseline excipient treated the same way disintegrated in two hours and a half.

Oldham. A. E. Martin.

Letters to the same effect have also been received from Mr. Fairweather, Mr. T. R. Jones and others.

Erratum.—On p. 161, col. ii., line 27 from bottom, in Dr. Granville's prescription, *for* "aquæ ad ℥xij" *read* "aquæ ad ʒxij."

℈j.—The preparation is a proprietary one, the formula of which, so far as we are aware, has not been published.

"*Medicus.*"—(1) We believe not. (2) In the "Student's Number" published during the present month in connection with any of the medical journals.

P. J.—We are not acquainted with a recipe for salicylated wool which dispenses with the use of glycerine.

J. H. Garrett.—*Fucus vesiculosus. Calliblepharis ciliata. Rhodomela subfusca. Furcellaria fastigiata. Cladostephus verticillatus. C. spongiosus. Ceramium rubrum. Chondrus crispus. Enteromorpha compressa. Jania rubens. Cystoclonium purpurascens. Phyllophora rubens.*

J. Hutchinson.—(1) *Pastinaca sativa.* (2) *Senecio erucifolius.* (3) *Polygonum aviculare.*

Regor Segontianus.—(1) Cannot say without the flower. (2) *Euphorbia Peplus.* (3) *Artemisia vulgaris.*

Quercus.—We are unable to answer your question.

Communications, Letters, etc., have been received from Mr. Lawson, Mr. Amys, Apprentice, Export.

ALLEN & HANBURYS' Granular Effervescent Preparations.

	Per lb.
Ammonium Bromide (*Granular & Effervescent*)	3/
Bismuth Ammonio-Citrate „ „	3/
Bismuth and Iron ... „ „	6/
„ and Pepsine ... „ „	6/6
„ Pepsine and Iron „ „	6/6
„ „ and Strychnine „	8/
„ „ and Quinine „	8/6
„ „ and Bromide of Potassium	8/
„ „ Iron and Strychnine „	8/
Caffeine Citrate ... ... „ „	8/
Carlsbad Salts ... ... „ „	2/8
Cerium Nitrate ... ... „ „	4/
„ Oxalate ... ... „ „	3/6
Cheltenham Salts ... „ „	2/8
Cinchonine Citrate ... „ „	3/4
„ „ and Iron „ „	3/4
Friedrichshall Salts ... „ „	2/8
Iron Ammonio-Citrate ... „ „	2/8
„ Bromide ... ... „ „	4/
„ Carbonate ... ... „ „	2/
„ Citrate ... ... „ „	2/6
„ Iodate ... ... „ „	4/6
„ Iodide ... ... „ „	3/
„ Phosphate ... ... „ „	2/8
„ and Arsenic ... „ „	4/6
„ and Magnesia Sulphate „ „	4/
Kissingen Salts ... ... „ „	2/8
Kreuznach Salts ... „ „	2/8
Leamington Salts ... „ „	2/8
Lime Hypophosphite ... „ „	3/6
„ „ and Pepsine „	6/
„ and Soda Hypophosphite „	3/6
Lithia Carbonate ... „ „	4/
„ Citrate ... ... „ „	4/
Lithia Citrate and Potash (*Granular & Effervescent*)	4/
MAGNESIA CITRATE ... „ „	1/6
„ in 4-lbs. and 7-lbs. Bottles	1/5
„ 2nd quality „	1/2
Marienbad Salts ... „ „	2/8
Nux Vomica ... ... „ „	4/6
Potash Benzoate ... „ „	4/
„ Bicarbonate ... „ „	2/8
„ Bromide ... „ „	3/
„ Chlorate ... „ „	2/8
„ Citrate ... ... „ „	3/
„ Iodide ... ... „ „	3/
„ Nitrate ... ... „ „	2/6
Pullna Salts ... ... „ „	2/8
Quinine Citrate ... ... „ „	8/
„ „ and Strychnia „	6/6
„ „ and Iron „ „	6/
„ „ Iron and Bromide of Potassium	6/6
„ „ „ Iodide of Potassium	6/6
„ „ Iron and Strychnia „	6/6
„ „ and Iron Phosphate „	6/6
„ Iodate ... ... „ „	10/
„ Salicylate ... „ „	10/
„ and Caffeine Salicylate „	10/
Seidlitz Mixture ... „ „	2/
Seltzer Salts ... ... „ „	2/8
Soda Citro-Tartrate ... „ „	2/
„ Hypophosphite ... „ „	3/6
„ Iodide ... ... „ „	3/
„ Nitrate ... ... „ „	2/6
„ Phosphate ... „ „	2/6
„ Salicylate ... „ „	4/6
„ Sulphate ... ... „ „	2/8
Vichy Salts ... ... „ „	2/6

Samples of any of the above Free on application.

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EFFERVESCENT SALINE

This is a finely granulated preparation, which in dissolving produces a sustained sparkling effervescence, and a clear, bright solution. It possesses all the advantages of an agreeable saline, combined with the anti-febrile properties of Chlorate of Potash, of which it contains a considerable percentage. It is, in short, an efficient aperient and febrifuge, and makes an exceedingly pleasant and refreshing beverage.

PRICES.—This Saline is supplied in bulk at 1s. 6d. per pound; 1s. 5d. per pound for 14 pounds; 1s. 4d. per pound for 112 pounds; or in ½-pound bottles (to retail at 1s. 6d.) 11s. per doz. With or without Labels. It is supplied also on the same terms with A. & Hs'. own Labels and Wrappers ready for Retail Sale.

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SPECIALITÉ BOXES.

The lid removes, and the box serves as a holder for the Cone.

REDUCED PRICES:

The Wooden Barrels	7/-	per doz.
The Hardwood Boxes	7/-	„
The Plain Willow do.	3/6	„
The Bottles	5/6	„

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SIR JAMES MURRAY'S PURE FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of

ACIDITY, INDIGESTION, HEARTBURN, GRAVEL & GOUT.

Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

His **FLUID CAMPHOR** is a valuable remedy for Sleeplessness and Weak Nerves.
Bottles, 1s. and 2s. each.

GLYCEROLE OF PEPSINE

A SPECIAL PREPARATION.

Perfectly reliable, and the most valuable fluid form for the administration of *Pepsin. Porci.* It is of definite strength and slightly acid; free from odour, and almost tasteless.

7/ per lb., C. Qts. 6/6, W. Qts. 6/.

T. GREENISH, { 20, New Street, Dorset Square, and 5, Bathurst Street, Hyde Park, W.

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Albatum or White Rouge, for Cleaning Gold, Silver and Plated Goods.

Since its introduction as a substitute for the ordinary Rouge, a quarter of a century ago, the sale has amazingly increased both at home and abroad. A trial is only needed to prove its superiority over other Plate Powders in use. Sold in Boxes at 1s. and 2s.; Tins, 6s.

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Chemists selling TASTELESS PILLS *have an advantage over others neglecting to do so.*

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Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

The Registrar of Trade Marks (after giving the usual public notice prescribed by Parliament to allow of opposition) has granted us the above "Trade Mark," thus officially recognising us as the "ORIGINAL MAKERS OF TASTELESS PILLS," and no pills will be sent out without this mark on all bottles or packages.

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Samples, with a list of pills from upwards of 500 different forms which are kept in stock, will be forwarded free on application.

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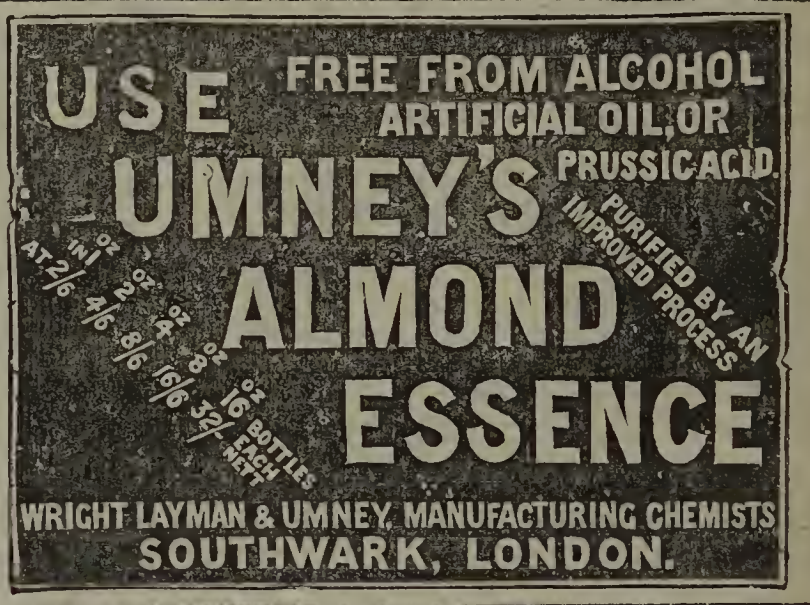

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Lavender Water.

In Bottles, from 1/ to 6/; in Cases, from 3/ to 15/6.

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FOR TERMS FOR ADVERTISEMENTS, SEE PAGE XVIII.

Certain Sudden **DEATH**
to all Grubs, Woolly Aphis, Green and Black Fly, Lice, Red Spider, Thrip, Mealy Bug, Caterpillars, Ants, Worms, &c.

FIR TREE OIL

INSECTICIDE (Soluble in Water).

For destroying ALL INSECTS and PARASITES that infest Trees and Plants, whether at the Roots or on the Foliage. It cures Mildew and Blight on Fruit or Foliage, and a weak solution Kills all Vegetable Grubs, Turnip Fly, &c. Clears Grapes from Mildew or Mealy Bug without affecting the bloom. Thickened with a little clay, makes a good winter dressing. Destroys Lice and Fleas on Animals and Birds. Sold by Seedsmen and Chemists, 1s. 6d., 2s. 6d., and 4s. 6d. a bottle; per post 3d. extra. Per gallon 12s. 6d., or less in larger quantities.

A Treatise on FIR TREE OIL, as an Insecticide, its application to Plants and Animals, sent Post Free, on receipt of address, by the Manufacturer,
E. GRIFFITHS HUGHES, Manchester.
Wholesale:—HOOPER & CO.; CORRY, SOPER, FOWLER & CO.; C. E. OSMAN & CO.; and from all the London Seed Merchants and Wholesale Patent Medicine Houses.
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FOR THE PROMPT RELIEF OF CHEST COMPLAINTS, COUGHS, AND SORE THROATS.
SUPPLIED BY ALL CHEMISTS.

The popularity of this natural and strongly medicinal remedy is not due to advertising so much as to its own inherent virtues. It is gathered by the honey bees from the horehound honey blossoms.

The following Testimonials are not from obscure and unknown people, but from some of the leading and best known in the kingdom. No medicine introduced to the public has ever deserved and received such patronage and success.

HAWTHORN LODGE, FINCHLEY NEW ROAD, N.W.,
Messrs. W. M. HOGE & Co., London. *March* 30, 1883.
Gentlemen,—I have much pleasure in stating that I consider your "Horehound Honey" the most wonderful remedy I have ever tried, possessing properties which are nothing short of marvellous for the cure of affections of the throat and chest. I shall never be without a bottle of "Horehound Honey."
Yours very truly, MARIE ROZE.

Your "Honey" is delicious. ELLEN TERRY.

The Lord Mayor of London orders it.

MANSION HOUSE, LONDON, E.C., *September* 28, 1883.
The LORD MAYOR would thank Messrs. W. M. HOGE & Co. to send him half a dozen of their "HOGE'S Horehound Honey," which has been *well recommended* to him.

W. L. BRIGHT, Esq., son of the Right Hon. JOHN BRIGHT, M.P., says "HOGE'S Horehound Honey" CURED his father of a bad cough.

What the Clergy say of it.

ELY, CAMBS., *May*, 1883.
The Rev. C. D. KINGDON has great pleasure in bearing testimony to the excellent properties of "HOGE'S Horehound Honey" for preaching. It makes the voice clear and pleasant, and takes away all that huskiness in the throat which is so uncomfortable to preacher and congregation.

From the Champion Billiard Player.

38, MARYLANDS ROAD, WESTBOURNE PARK,
Messrs. W. M. HOGE & Co. *Oct.* 27, 1883.
Gentlemen,—I have much pleasure in certifying to the excellence of your "Horehound Honey." I have found great relief from taking it, and strongly recommend it for coughs.
Yours faithfully, JOHN ROBERTS, Jun.

What it did for Geo. F. Black, Esq.

7, SUFFOLK LANE, CANNON STREET, E.C.,
Messrs. W. M. HOGE & Co., London. *London, April* 20, 1883.
Gentlemen,—Having suffered for many years with irritation of the throat and chest, I never found any remedy to relieve the irritation until I purchased a bottle of your "Horehound Honey," which I did a few days since. I want to inform you it had a wonderful soothing effect, affording relief at once. Please send me one dozen bottles, and oblige yours truly, G. F. BLACK.

Price 1s. 1½d. per Bottle. { *To be had of any Chemist.*

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LIVERPOOL,

Importers of Brazilian Drugs

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Director: Mr. W. SPENCER TURNER.

The present Session began on

MONDAY, AUGUST 18th,

as advertised.

Intending Students are requested to join without any further delay, as there are only a few vacancies.

The Dental Hospital of London

MEDICAL SCHOOL, LEICESTER SQUARE.

The WINTER SESSION will commence on Wednesday, October 1.

LECTURES.

Mechanical Dentistry—Dr. Walker, M.R.C.S., L.D.S., on Wednesdays, at 5 p.m., commencing on October 3.

Metallurgy in its Application to Dental Purposes—Professor A. K. Huntington, F.C.S., on Tuesdays, at 12 a.m., commencing October 7.

The SUMMER SESSION will commence in May, 1885.

Dental Surgery and Pathology—
on Tuesdays and Fridays, at 8 a.m.

Dental Anatomy and Physiology (Human and Comparative)—Mr. Arthur Underwood, M.R.C.S., L.D.S., on Wednesdays and Saturdays, at 8 a.m.

General Fee for Special Lectures required by the Curriculum, £15 15s.

DENTAL HOSPITAL OF LONDON.

Consulting Physician—Sir J. Risdon Bennett, M.D.

Consulting Surgeon—Mr. Christopher Heath, F.R.C.S.

Consulting Dental Surgeons { Mr. S. Cartwright, F.R.C.S. / Mr. John Tomes, F.R.S.

	Dental Surgeons.	*Assist-Dental Surgeons.*
Monday, 9 a.m. ..	Mr. D. Hepburn ..	Mr. L. Read.
Tuesday, ,, ..	Mr. R. Woodhouse ..	Mr. A. S. Underwood.
Wednesday, ,, ..	Mr. Gregson	Mr. Claude Rogers.
Thursday, ,, ..	Mr. Hutchinson ..	Mr. G. Parkinson.
Friday, ,, ..	Mr. Moon	Mr. Storer Bennett.
Saturday, ,, ..	Mr. F. Canton ..	Mr. Truman.

Chloroformists { Mr. Braine, F.R.C.S.; Mr. Bailey, M.R.C.S.; / Mr. T. Bird, F.R.C.S.; Mr. Mills, M.R.C.S.

Medical Tutor—Mr. W. B. Paterson, F.R.C.S., L.D.S.

Demonstrators—Mr. John Ackery, M.R.C.S., L.D.S., and Mr. W. Hern, M.R.C.S., L.D.S.

House Surgeon—Mr. S. Buckland, L.D.S.

Assistant House Surgeon—Mr. A. King, L.D.S.

The Medical Tutor holds Classes before each Examination. The Demonstrator attends each day.

The House Surgeon and Assistant House Surgeon attend daily while the Hospital is open.

On every day during the Lecture Session the Surgeons of the day will, if practicable, give Demonstrations, especially intended for the Junior Pupils, of the Operations performed in Dental Surgery.

The Saunders Scholarship of £20 per annum and Prizes are open for competition.

Fee for Two Years' Hospital Practice required by the Curriculum, £15 15s. Fees for Lectures and Practice, £31 10s. Additional Fees for a General Hospital for the two years to fulfil the requirements of the Curriculum vary from £40 to £50.

Further particulars may be obtained on application to the Dean, at the Hospital, where he will attend in the afternoons from September 26th to October 1st, inclusive, from 5 till 5.30 o'clock, or on Wednesday mornings from 10.30 till 12.

MORTON SMALE, Dean.

TO CHEMISTS.

MR. CUPISS, Diss, Norfolk, Proprietor of the Constitution Balls, will have pleasure in supplying the Trade, on application, with Bills for distribution, with valuable Testimonials recently received, also attractive Posters, forwarded by Parcels Post.

To prevent error, it is desirable to send a card of address.

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Prospectuses of the Pharmaceutical Courses in the Session 1884-5 will be forwarded on application.

J. Holme Nicholson, Registrar.

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PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(*From the Royal School of Mines*),

6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.

STUDENTS REASSEMBLED SEPTEMBER 3rd.

Notwithstanding the great mortality at the June and July Minors, over seventy-five per cent. of my students were successful at the two combined. Individual personal instruction, as usual. No demonstrators. All students work *separately*, therefore entry may be made at and for any length of time. Postal teaching for Preliminary and Minor a speciality; books unnecessary, notes sufficient. Send stamp for terms, &c.

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St. Thomas's Hospital Medical School,

ALBERT EMBANKMENT, LONDON, S.E.

The WINTER SESSION of 1884-5 will commence on OCTOBER 1st, when an Introductory Address will be delivered by Sir J. Risdon Bennett, M.D., F.R.S., at 3 p.m.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

MR. JUDD'S CLASSES
MINOR AND PRELIMINARY.

The Morning Class for the October Exam. began on the 1st Monday in September.

Resident and non-resident pupils can be received at any time for the October Minor and Preliminary.

Evening Classes from 7.30 to 10 o'clock. *Advanced* Minor on Monday and Thursday. *Intermediate and Elementary* on Wednesday and Friday. Preliminary Class on Tuesday, at 7 p.m. Preliminary Classes also on Tuesday and Friday afternoons, at 2.30. Successes are scored from these classes at each Minor and Preliminary Exam.

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For the Minor, Preliminary, and Bell Scholarship Examinations. Fee to either, 5s. per month. The lessons are carefully graduated, the number is unlimited, and all bear a direct application to examination requirements.

For terms, &c., call or write, with stamp, to

Mr. H. JUDD,
West Central School of Pharmacy,
31, REGENT SQUARE, W.C.

LIVERPOOL SCHOOL OF PHARMACY.
36, Oxford Street, Liverpool.

Principal: J. S. WARD, Ph. Ch., M.P.S.
(*Prize Medallist and South Kensington Prizeman.*)

The present session commenced on Monday, September 1st, with Two Courses of Lectures, one for the October candidates, and the other a full course extending over until the December Examination.

Three out of Four of those who have passed from this School at the recent Examinations have been successful on their first attempt.

A new Prospectus, with full particulars of the School premises, curriculum, fees and testimonials, will be forwarded on application.

"Thorough instruction."

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Bream's Buildings, Chancery Lane, W.C.

EVENING CLASSES IN
MATERIA MEDICA
AND
PRACTICAL PHARMACY
BY
Mr. J. B. L. MACKAY.

Quadruple Medallist and Hill's Prizeman of the Pharmaceutical Society; and one of the staff at the Royal School of Mines.

Commencing Wednesday, October 1st, from 8 to 10 p.m., and held weekly till May, 1885. Fees £1 for each Course. Apply for full particulars (gratis), or Syllabus (price 4d.), at the Library of the Institution.

Mr. J. B. L. Mackay's Science Classes, commencing in October. Highbury Institute, Islington, Botany, Tuesdays, 7 p.m.; Morley Hall, Mare St., E., Chemistry, Saturdays, 4 p.m.; Botany, Mondays, 7 p.m. 100 per cent. of Mr. Mackay's Students passed the Government examination in Botany last May. Private instruction to Medical and Pharmaceutical Students.

THE UNIVERSAL
Postal System of Instruction

In connection with the Westminster College, has been established for the express purpose of preparing for the various examinations of the Pharmaceutical Society students residing in the country, or those unable to attend a School of Pharmacy.

Pharmaceutical Preliminary		**Fee**	**10s. 6d.**
Pharmaceutical Minor	...	**Fee £1**	**1s. 0d.**
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Medical Preliminary	...	**Fee £1**	**1s. 0d.**

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For Prospectus and further particulars, apply to

Messrs. WILLS & WOOTTON,
Trinity Square, London, S.E.

WESTMINSTER COLLEGE

TRINITY SQUARE, BOROUGH, LONDON, S.E.

The next Course of Lectures will commence on Monday, October 27th.

FEES:—

To the December Examination	...	**£5 5s.**
To the February ,,	... ...	**£8 8s.**
Six Months' Course	... ...	**£10 10s.**
Twelve Months' Course	...	**£15 15s.**

PRELIMINARY DIVISION.

Special Classes to prepare Candidates for the Preliminary Examination of the Pharmaceutical Society are held daily, from 10 to 12 a.m., on the following subjects:

Latin Grammar and Parsing. Translation of Latin into English, and vice versa. English Grammar and Essay Writing. Arithmetic and the Metric System of Weights and Measures.

The next Course will commence on October 14th.

EVENING LECTURES,
Laboratory Instruction and Classes.

Gentlemen engaged during the day, and unable to leave business, may be prepared for the Pharmaceutical Examinations in the evening.

For Prospectus and other information, apply to

Messrs. WILLS & WOOTTON.

THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

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The First Course of Lectures and Classes of this Session has now commenced, and is attended by a full class of Students. A Short Course, especially adapted for Students who have already acquired a knowledge of the subjects, will commence on Monday, October 27th. Should any candidates join then who are commencing their studies they will complete the full Course by February next. Fees to December, 6 guineas; to February Examinations, 9 guineas.

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Principal.—Professor THOMAS WALLEY, M.R.C.V.S.

WINTER SESSION commences on the 27th October.

Preliminary Examination, 27th and 28th October.

Prospectuses and full particulars on application.

Classes open to Amateurs.

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STUDENTS' AIDS TO EXAMINATION.

Preliminary.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. Minor.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, Gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, Chemist, care of Mr. J. Edwards, Wye, Kent. Herbarium, 100 Plants, 5s.

TO PHARMACEUTICAL STUDENTS.

The next COMPETITION for the

Pattison Pharmaceutical Scholarship

Will be held on WEDNESDAY, OCTOBER 1, next.

The holder is entitled to FREE EDUCATION in all the Branches for the Minor Examination.

For all particulars apply to Secretary, Edinburgh School of Pharmacy, Marshall Street, Nicolson Square, Edinburgh.

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The SESSIONS of this School commence on 1st of October next; 5th of January, and 4th of May, 1885.

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BOTANY .. .. J. A. THOMSON, M.A. | MATERIA MEDICA and PHARMACY .. .. R. URQUHART.

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325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

FIFTEENTH SESSION, 1884-5.

A few vacancies still remaining.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 47 out of 51 Pupils passed the last Examinations.

ENGAGEMENTS WANTED.

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DISENGAGED.—As ASSISTANT or DISPENSER, where 2 or more are kept. London house preferred. Age 24. Minor and Hall. CHEMIST, 1, Market St., Harwich.

AS Junior ASSISTANT. Age 22. 6 years' experience. Height 5ft. 6in. R. W., Hambleton, S lby.

AS JUNIOR, in good house. City or West-end preferred. Passed Preliminary. Age 20½. First-class reference. Disengaged 4th October. J. H., 20, Burrowgate, Penrith.

LOCUM TENENS. Town or country. Experienced, reliable, and qualified. Disengaged the 22nd inst. A good class Retail and Dispensing business preferred. W. TAYLOR, 70, St. Stephen's Avenue, Shepherd's Bush, W.

AS MANAGER or ASSISTANT in charge. Age 25. 10 years' town and country experience. In or near London preferred. IMRIE, 64, High St., Eltham.

AS IMPROVER. London preferred. Salary not so much an object as time for study. Age 19. Good references. 5 years as Surgeon's Dispenser. E. A. KEMPTON, High St., Ely, Cambs.

AS MANAGER to a Widow, or with a view to succeed. South or S.W. Coast. Age 30. Single. PHARMACIST, 8, Adelaide Ter., Monk's Rd., Lincoln.

APPRENTICE.—The guardians of a youth who has passed his Preliminary examination, are desirous of placing him for 4 years as in-door APPRENTICE to a Chemist and Druggist, with high class business, in some large town in Midland Counties, Birmingham preferred. Moderate premium. Address, in first instance, H. MONKHOUSE, Chemist, Derby.

WHOLESALE.—Office or any Branch in a good house. City preferred. 4½ years in Retail. Permanency sought. Age 20¼. PALLADUIM, 23, Victoria Rd., Victoria Park, N.E.

AS JUNIOR, in a good Dispensing establishment, in London. West-end preferred. Age 21. Height 5ft. 9in. 4½ years' experience. PHARMACY, 67, Queen's Rd., Bayswater, W.

ENGAGEMENTS WANTED.

EARLY in October.—In good London house. Out-doors preferred. 8 years' town and country experience. Age 24. Minor qualification. T. S. WAYMOUTH, 5, Wilkes' Ter., Sandown, I.W.

BY November.—As ASSISTANT. Nearly 9 years' good experience in Retail and Dispensing. Age 24. A., 403, Oxford St., London, W.

LOCUM TENENS or to Manage Branch. 5 years' Liverpool and 9 years' West-end experience. First-class references. CHEMICUS, 150, Tottenham Court Rd., London, W.

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AS JUNIOR in London, with time to attend lectures two evenings a week. 5 years' experience in a first-class country business. Disengaged. B. 12, 74, Waterloo, Northampton.

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ENGAGEMENTS WANTED.

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A JUNIOR ASSISTANT, out-door, accustomed to a good class country Retail and Dispensing business. Send full particulars, with carte, to WM. HIGGINS, 49, Borough, Farnham, Surrey.

A GENTLEMANLY ASSISTANT, about 22, for a good class business. Capable of taking entire charge during principal's absence. Permanency. Salary £40. Enclose photo. and references, to G. PARKES, A.P.S., Chapel Ash, Wolverhampton.

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ASSISTANTS WANTED.

IMMEDIATELY.—A second ASSISTANT, for good Family and Dispensing business. Salary £40, in-doors. References as to qualification and character must be good. Apply, with all particulars and carte, to G. SPEECHLY, Bishop Stortford.

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AN ASSISTANT, with Minor qualification. Apply, stating usual particulars. W. CANNELL, Queen Sq., Wolverhampton.

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Morphiæ Sulphas ....1-3 grain.	Atropiæ Sulphas ....1-100 grain.
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Atropiæ Sulphas ....1-150 grain.	Strychniæ Sulphas ..1-100 grain.
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TABLE OF CONTENTS.

	Page
"The Month"	241
The Caucasian Petroleum Regions	245
The Bee-Keeping Industry in America. By J. L. Dow	249
EDITORIAL ARTICLES AND NOTES:—	
The Possible Development of Pharmacy	251
Notes:—The Inauguration of a New Session — Case of Poisoning by Strychnia Pills—The American Association — Biological Speculation —Fighting the Nostrum Trade in Germany—The Coal Tar Industry —Opium Adulteration	252
BRITISH PHARMACEUTICAL CONFERENCE:—	
Note on the Presence of Copper in some Pharmaceutical Preparations. By J. R. Hill	253
General Business	254
Place of Meeting for 1885	255
Election of Officers	255
THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE:—	
Address to the Chemical Section. By Professor Sir H. E. Roscoe	257
CORRESPONDENCE:—	
Permanganate of Potash Pills	260
Destruction of British Flora	260
Answers to Correspondents	260

Pharmaceutical Society of Great Britain,

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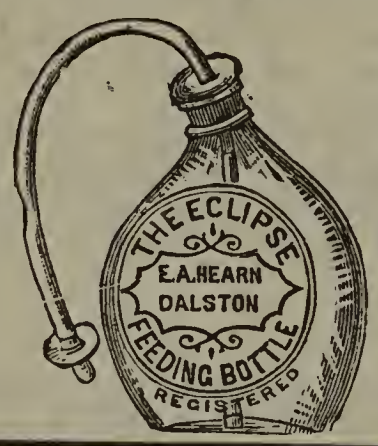

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"THE MONTH."

The "dead season" has been marked by the revival of several old topics, and amongst them the danger attending the use of aniline dyes for articles of dress worn in contact with the skin has been the subject of several letters that have appeared in the daily and other journals. "It is quite clear," says the *Times* in a leader, "that there must be aniline and aniline," because in some cases the skin is deeply stained by the dye without irritation being produced, whilst in others considerable injury results. This is no doubt partially true, though it may be pointed out that even if it be correct to attribute any disturbing influence to impurity in the pigment the irritation or non-irritation may be so metimes due to varying degrees of susceptibility in different skins, whilst it is, at least, as strong an argument in favour of the possibility of preparing innocuous aniline dyes that in other cases no staining at all occurs. It is not clear, however, upon what grounds it is assumed almost invariably that where irritation to the skin is produced it is necessarily due to a residuum from the arsenic acid used as an oxidizing material in the aniline manufacture. This assumption has given rise to somewhat ludicrous prohibitions in, at least, one foreign country; and at home it is only necessary to mention the word "arsenic" to provoke some writers to run through the whole gamut of charges that have been brought against this *bête noire*. Nevertheless, arsenical compounds are not unknown or unvalued as remedies in skin diseases, though considering that arsenic would, in the worst cases, be present only as a mere contamination of a very dilute form of the pigment, any physiological action would hardly be expected from so minute a quantity. On the other hand, it is to be borne in mind that the various aniline compounds are closely allied to the alkaloids, a group of substances which are, as a rule, extremely active physiologically; it might, therefore, be expected *à priori* that some of these artificial compounds would themselves be capable of exercising a correspondingly powerful effect. At any rate, it does not seem superfluous to suggest that a little of the energy which is being devoted to the multiplication of these compounds of every possible shade of every colour might be turned profitably to the selection of those that are physiologically inert and to a closer study of the conditions under which they can be used as dyeing materials for articles of dress without extending their pigmentary properties to the human cuticle.

The manifestation of symptoms of poisoning in upwards of one hundred residents in Brooklyn (*Lancet*, September 6, p. 441) after eating ice cream flavoured with natural vanilla recalls a similar occurrence in Vienna in 1873, the report upon which by Dr. Rosenthal (*Pharm. Journ.*, [3], iv., 838, 852), although it presented no satisfactory conclusion, may be advantageously referred to. The symptoms observed in Brooklyn were practically the same as those in the Vienna cases, consisting in severe pains in the hypogastric and epigastric regions, with violent vomiting and purging and in many cases serious collapse, accompanied by blueness, coldness and shrinking of the skin, like that observed in cholera. At first the blame was thrown upon copper derived from the vessels in which the cream had been prepared, but an examination of these showed that the tinning was continuous, whilst no metallic or other poison was detected upon chemical examination. Dr. Sizer, who reports the case, evidently suspects a formation of "ptomaines," consequent upon the decomposition of the cream before freezing, principally on the ground that a fetid odour was noticed during the analysis. But the cream used for the noxious product had come from two out of twenty-seven packages, none of the remainder of which is known to have produced injurious effects. In Vienna the same suspicion was at first entertained, but was put out of court by the fact that several persons who suffered had not partaken of a cream compound at all, but of a farinaceous dish flavoured with vanilla. Moreover, the cream theory is hardly consistent with the experience that these poisoning epidemics, of which there have now been several, do not occur in connection with the eating of cream ices other than those flavoured with vanilla. On the other hand, rightly or wrongly, vanilla pods are widely credited with occasionally possessing poisonous properties. Dr. Rosenthal mentions a case where a confectioner in Altona, having been compelled to give up his business in consequence of some persons being poisoned by vanilla cream ice supplied by him, disposed of his stock of vanilla to a confectioner in Bergen, where the ice made with the pods also proved to be poisonous. In the paper on "vanillism," occurring among persons employed in handling vanilla (*Journ. Phar. Chim.*, [5], x., 35), which has already been referred to (before, vol. xiv., p. 423), Dr. Layet avers that vanilla ingested into the system sometimes acts as a true poison, and he associates this character with an inferior variety called "vanillon," the pods of which are free from rime, soft, viscous and nearly always open. He also gives reasons for believing that the mould occurring on the pods is sometimes poisonous. The unfavourable reputation of vanilla has also made its way into the text-books, where the steeping in cashew-nut oil and the methods of drying have been variously credited with the mischief. It may be added that according to M. Jaillet, in the Island of Réunion, the tree yielding the "purging nut" (*Jatropha Curcas*) is frequently used to support vanilla creepers, and it has been pointed out in this Journal (xi., 430) that there is nothing improbable in the occasional absorption of the acrid juice of this euphorbiaceous plant to an extent sufficient to affect the vanilla.

The occurrence in the same city, a few weeks later, of another less considerable series of cases of poisoning by vanilla ice is one of those curious instances of the close repetition of ordinarily rare events that sometimes attract attention. Like the previous cases, none proved fatal, though the distress is said to have been greater and the prostration very marked. In this second instance, however, artificial vanillin seems to have been used as the flavouring agent, and the result has been attributed to the instability of that compound. If this assumption be correct this event furnishes another illustration of the remark of the late President of the Pharmaceutical Conference in respect to the relative stability of natural and artificially formed compounds. It does not follow, however, as seemed to be then almost suggested, that the greater stability is at all due to "vital force." Quite as probable an explanation seems to be that the artificial compounds are not always absolutely identical with the natural substances, or that the materials used in building them up are seldom if ever absolutely pure, so that there is a consequent formation of homologues and

other contaminating compounds, increasing in complexity with each successive step of the process. In the plant, of course, the formation of the compound is not disturbed by such adventitious conditions.

In a paper on the connection between the condition of true solution and that of pseudo-solution (in which finely divided solids will remain suspended for a considerable time without precipitation, while showing the phenomenon known as Brownian motion), Mr. Nicol points out the agreement of observed facts concerning the latter state with the molecular theory rather than with the hydrate theory of solution (*Chem. News*, Sept. 12, p. 124). According to the molecular theory the solubility of a salt in water is a consequence of the attraction of the water molecules for the individual salt molecules exceeding that of the salt molecules for one another; the solubility or insolubility of the salt would therefore depend largely upon its cohesion. In the case of barium sulphate the cohesion is great and the solubility consequently small; but if the cohesion were sufficiently overcome by mechanical means the finely divided salt would remain suspended in water in a state of pseudo-solution, differing from true solution only in the degree of division of the solid. If this be correct, it would follow that if it were possible to divide the salt mechanically into single molecules the hitherto insoluble body would pass into solution, unless indeed its molecules manifested eventually an attraction for one another exceeding that of the molecules of water for them, as may be the case in the slow precipitation of relatively insoluble compounds from dilute solutions. On the other hand, if to a saturated solution of a salt soluble in water, such as sodium chloride, another salt be added which is still more soluble, such as calcium chloride, the less soluble salt is precipitated; the explanation being that the molecules of the more soluble salt have the greatest attraction for the molecules of water, the result being analogous to the precipitation of suspended matter from water by a soluble body like alum.

In a report presented to the Director-General of the Army Medical Department by Surgeon-Major Lewis, upon his return from a visit to Marseilles (*Med. Times*, Sept. 20, p. 397), a strong doubt is expressed as to the cholera-producing powers of the now-celebrated "comma" bacillus of Dr. Koch. Mr. Lewis says that had the German expert and his colleagues submitted the secretions of the mouth and fauces—the very commencement of the alimentary canal—to a careful microscopic examination, such as that to which they have submitted alvine discharges, they would have found that comma-like bacilli, identical in size, form, and their reaction with aniline dyes with those found in cholera dejecta, are ordinarily present in the mouths of perfectly healthy persons. In order to demonstrate this he recommends that a little saliva, taken preferably in the morning before the teeth are brushed, should be allowed to dry thoroughly on a cover glass, and the film formed floated for a minute or two in one of the aniline solutions ordinarily used for such purposes, after which the cover should be rinsed gently with distilled water and dried thoroughly. This preparation mounted in dammar varnish or Canadian balsam dissolved in benzol should be examined under a $\frac{1}{12}$ or $\frac{1}{8}$ inch oil immersion lens.

The outbreak of cholera in the south of Europe and the sanitary precautions to which it has given rise have largely affected the demand for disinfectants and antiseptics. Messrs. Gehe state that in Germany the demand for carbolic acid, both solid and liquid, was so great during the summer months that the price rose 100 per cent., without reducing the demand within the capability of supply. Lately, however, it has been less in request, in consequence of the results of experiments which have shown that it is not a suitable agent for combating the "comma" bacillus, since it is only effective in preventing the development of that organism when the solution is of the strength of at least 1 in 400, whilst a weaker solution appears in some respects to favour the bacillus. Sulphate of copper and corrosive sublimate are considered to be more effective, since these prevent the development of bacilli, the former when of the strength of 1 in 2500 and the latter of 1 in 100,000. In order to kill the "comma" bacillus, however, larger quantities of these substances are required, and for this reason neither of them is available for internal administration. Coto bark is in continuous demand, but the stocks of the true kind have nearly disappeared, whilst fresh importations are not expected. Cotoin has therefore become much dearer, and there is a probability that there will be a necessity to fall back upon the allied but less active compound from paracoto bark. Pharmacognostically, the difference between coto bark and the paracoto bark is not great, whilst the two compounds obtained from them closely resemble each other. In prospect of a possible substitution it may be useful to state that cotoin melts at 124° C., and is dissolved by nitric acid with a blood red colour, slowly in the cold but rapidly when heated; whilst paracotoin melts at 152° C. and gives only a yellow colour with nitric acid.

There are also a few other notes in Messrs. Gehe's new circular of which mention may be made. Referring to the requirement of the British Pharmacopœia that elaterium shall yield not less than 20 per cent. (erroneously quoted as 25 per cent.) of elaterin in colourless crystals, it is stated that this high figure has not been observed and that they are content to obtain 12 to 15 per cent. of pure crystalline glucoside. Physostigmine salicylate, which was introduced into the new German Pharmacopœia, is said to have proved less useful than the sulphate, since, although it is less hygroscopic, it is only soluble in water in the proportion of 1 in 130; but the citrate is described as being less hygroscopic and nearly as soluble. Helenin (alantoin camphor) is said to have given good results in cases of confirmed catarrh and incipient phthisis, administered in 0·01 gram doses. Nickel bromide is in demand for the treatment of epilepsy, the dose being 0·05 gram. "Kairin" is not now so much in request as when first introduced, which is attributed to its disagreeable taste. It is said that in order to overcome this objection an Italian physician has injected it subcutaneously with satisfactory results. Nevertheless, "kairin" is reported to be left in the background by "antipyrin," an analogous proprietary febrifuge referred to recently in these columns, which is said to be less disagreeable and more powerful, though the dose—two grams hourly—is certainly not a small one. Very little, if any, information has appeared, in this country at least, respecting the constitution of this compound, and it hardly sheds much fresh light to say it is now described as "oxydimethylchinizin!"

In a note upon benzoic acid in the article on the German and United States Pharmacopœias which appeared in this Journal (vol. xiv., p. 22), it was remarked that probably the conflict in existing statements as to which fraction of a sublimation of benzoic acid is most coloured might be due to the different temperatures at which different operators had worked. This remark finds confirmation in a recommendation put forward by Messrs. Gehe that a definite temperature for the sublimation of benzoic acid should be prescribed in the next edition of the German Pharmacopœia. Referring to salicylic acid, the same firm mentions that a process has been devised for producing the same quantity of that acid from half the quantity of materials used hitherto. It may be presumed that this points to some means of converting the whole of the sodium carbolate treated with carbonic anhydride into salicylate in one operation, instead of the formation of disodic salicylate and free carbolic acid, as in Kolbe's original process.

The liability of quinine sulphate to vary greatly in respect to its water of crystallization has frequently proved a source of vexation to the wholesale and of loss to the retail dealer. The British, French, German, and United States pharmacopœias all agree in describing it as containing seven molecules of water of crystallization, but it is well known that whatever the salt may contain when it leaves the maker's hands, if it be at all exposed the water is liable to fall far below this quantity. In a paper read before the American Pharmaceutical Association (*Weekly Drug News*, Sept. 13, p. 524), Mr. Parsons, therefore, recommends that the form of the salt containing two molecules of water should be made official, instead of that with seven molecules. It may be remarked that this is the proportion of water of crystallization which in 1876 Mr. Cownley found to represent the most stable condition of the salt (*Pharm. Journ.*, [3], vii., 189), and this has been confirmed by the experiments of Mr. Parsons.

Among the numerous substances that have lately been put forward as indicators, phenolphthalein has taken a prominent position, but the necessity for the further investigation of its behaviour towards alkalies and acids, and especially in respect to ammonia, was demonstrated in the exhaustive paper by Mr. Thomson, published in this Journal (vol. xiv., pp. 572, 705). Professor Flückiger in following up the subject has found (*Archiv*, xi., 605) that under all conditions ammonium salts behave towards a solution of phenolphthalein as if they contained free acid. The explanation suggested is that in aqueous solution these salts undergo dissociation somewhat in the same manner as dry sal ammoniac is known to do when heated, and that then the action of the liberated acid upon the phenolphthalein is unmodified by the base, in accordance with Mr. Thomson's observation respecting ammonia. In like manner a number of salts of quinine, morphine, codeine, strychnine and brucine were found to behave like acids in decolorizing a solution of phenolphthalein previously reddened by the addition of an alkali, and the probability of the explanation suggested is stregthened by the fact that no solid alkaloid, either in alcoholic or aqueous solution, appears to be capable of reddening a colourless solution of phenolphthalein. Whether the liquid alkaloids behave differently has not yet been determined. A sample of coniine, reddened a solution strongly and one of nicotine only very faintly. On the other hand, a faintly alkaline solution was sluggishly decolorized by coniine hydrobromate.

It is pretty well understood that all commercial specimens of methylic alcohol contain more or less acetone, which upon the addition of iodine gives rise to the formation of iodoform. In order to get rid of this impurity it has been proposed to treat the crude spirit so as to convert the methyl alcohol into crystalline oxalate of methyl and then regenerate the alcohol by treatment with a base. But even after this operation there still remains in a few cases some impurity capable of converting iodine into iodoform. In order to remove these last traces, Messrs. Regnauld and Villijean advise (*Répertoire*, Sept., p. 413) the conversion of the foreign compound into iodoform and the decomposition of this into alkaline iodide and formate. This is effected by dissolving in the regenerated alcohol about one-tenth of its weight of iodine, adding to the solution gradually a sufficiency of liquor sodæ to completely decolorize it and leave it distinctly alkaline, and then carefully distilling off the methylic alcohol, which after rectification over quicklime has a density of 0·810 at 15° C.

In a recent circular, Messrs. Schimmel, of Leipzig, report that they have for the first time prepared about three kilograms of oil of roses from German grown flowers, and that the results have been so favourable as to encourage more extensive experiments in rose oil distillation. The product is said to have exceeded Turkish oil in the fineness and strength of its aroma and to differ from it in having a much higher congealing point, the German oil solidifying at +32° C., while the Turkish, on the average, does not congeal above +20° C.

Messrs. Schimmel also refer to the enormous demand for menthol which has been developed during the last fifteen months, consequent upon its introduction as a remedy for the relief of headache and neuralgia, and they say that its application might have been greatly extended had it been possible to produce it in sufficient quantity. With respect to the suggestion that menthol might be obtained from American peppermint, it is stated that according to Messrs. Schimmel's experience this can be done in only two ways: either the menthol must be removed in chemical combination or frozen out after previous fractionation of the oil. Both methods yield menthol, but, of course, only to the extent it is present in American peppermint oil, or about 20 per cent. But by the first process the remaining 80 per cent. of the oil is destroyed, whilst by the second there is a residue of about the same quantity of almost worthless oil. It is not thought, therefore, that there will be any serious competition between the Japanese and the American oils on this ground.

The extent to which cotton-seed oil is reported to be used as an adulterant, or even as a substitute, for olive oil has excited the ingenuity of chemists to devise a means of detecting the fraud, which has been quickened by the offer by an Italian Chamber of Commerce of a large money reward for the devising of a satisfactory test. Perhaps on the whole the use of nitric acid in the manner suggested by Mr. Conroy (*Pharm. Journ.*, [3], xi., 933) fairly answers the requirements, though not so readily applicable as might be wished. Mr. S. S. Bradford, however, recommends the use of a solution of subacetate of lead

(*Amer. Journ. Pharm.*, Sept., p. 470); this, he says, invariably produces a red colour in cotton-seed oil or a mixture containing it, which he has never observed upon similar treatment of any other vegetable or animal oil. Mr. Bradford says also that whilst saponification takes place at once if solution of subacetate of lead be shaken with pure olive oil, no saponification occurs, even after a long time, if the sample tested contains any cotton-seed or other added oil.

As an illustration of the uncertain nature of some of the articles which pass into commerce under the name of "cod liver oil," Herr Krieger, of Coblenz, states (*Pharm. Zeit.*, September 17) that he has in his possession a sample, which, although it answers to the requirements of the Pharmacopœa Germanica, especially in giving the colour with sulphuric acid beautifully, is, nevertheless, not a liver oil at all, to say nothing of it being cod liver oil. It is described as being a mixture of about 70 per cent. of a Japanese fish oil and 30 per cent. of white Newfoundland seal oil. It is not known exactly what fish yields the principal constituent of this mixture, though the oil comes into commerce at a low price, but according to unconfirmed statements of Japanese dealers, it is small and resembles a sardine. The white seal oil, being used principally to bring the mixture to a proper colour and improve the odour and flavour, might probably be substituted by another fish oil without affecting the behaviour of the mixture towards the official test. It may also be mentioned that in a treatise upon medicinal cod liver oil, published this year in Leipzig and quoted in the *Zeitschrift für analytische Chemie* (xxiii., 432), Herr Meyer proposes a modification of the test for cod liver oil, which consists in briskly shaking ten parts of oil with one part of a mixture of equal parts of concentrated sulphuric and nitric acids. Pure cod liver oil is said to show a fiery rose colour, which rapidly passes into lemon yellow. The initial rose colour is, however, also characteristic of oil from other species of *Gadus*, and it passes into a yellow; though it is not always so pure a colour as that produced with the official oil from *Gadus Morrhuæ*.

The tendency of some practitioners in France to administer ether in rather high doses has partially been met by the introduction of *perles* containing that medicament; but patients complain frequently of the disagreeable effect produced when the ether diffuses over the mucous membrane of the stomach upon the rupture of the *perle*, which is sometimes so painful as to necessitate the cessation of the treatment. In order to overcome this difficulty, M. Daunsey recommends (*Répertoire*, Sept., p. 404) the administration of the ether in a mixture of alcohol and syrup, to which he gives the name "etherodine," and has found to be acceptable. The proportions are—alcohol of 80 per cent., slightly aromatized with peppermint, anise, or raspberry, 400 parts; simple syrup, 500 parts; pure ether, a sufficiency. The three liquids are introduced into a suitable vessel, shaken carefully and then allowed to stand; after a few hours the liquid becomes perfectly clear and should then be bottled until required for use.

About twelve months since it was mentioned in these columns (vol. xiv., p. 244) that a manufactory for the production of santonin on a large scale was being set up at Tschimkent, in the province of Taschkent, near the steppes in which santonica is collected. Some specimens of the plant intended to be used in the manufacture having come into the hands of Professor Flückiger, he reports (*Archiv*, xi., 612) that while they are stouter than the specimens mentioned in the 'Pharmacographia' as having been received from Professor Willkomm under the name of *Artemisia Cina*, and as having flower-heads differing from the worm-seed of trade in having fewer scales, yet in formation of the leaves, the flower-heads, the flowers themselves, and in every other respect, they correspond with Professor Willkomm's plants. Professor Flückiger is of opinion that it is the same plant as is figured in Bentley and Trimen's 'Medicinal Plants' as *Artemisia pauciflora*, Weber, and which was distributed thirty years ago from Sarepta as *A. maritima*, var. *pauciflora*, Ledebour. Whilst leaving it for systematic botanists to determine whether the worm-seed plant is to be maintained as a distinct species under the name of *Artemisia Cina*, or whether it is to be considered a form of *A. maritima*, Professor Flückiger says that he observes no important difference.

Mr. R. Rother reports the results of an examination of some fruit of the balsam of peru tree, which had been placed at his disposal by Messrs. Stearns and Co., of Detroit (*New Idea*, August, p. 334). In consequence of the marked "tonka" odour and taste possessed by the yellowish-white beans, they were powdered and exhausted with dilute alcohol, and from this tincture crystalline coumarin was separated equal in weight to nearly 2 per cent. of the beans used. From the husks of the legume a considerable quantity of a peculiar transparent soft brown resin was obtained, soluble in alcohol, ether and chloroform, extremely bitter and somewhat acrid, as well as a white substance, insoluble in alcohol, apparently of the nature of a wax.

The rhizome of the *Cimicifuga racemosa*, Elliott (*Actæa racemosa*, Linn.), which is official in the United States, where it has some reputation as a nervine tonic, has undergone a fresh investigation at the hands of Mr. M. S. Falck (*Amer. Journ. Pharm.*, Sept., p. 459), who has succeeded in obtaining from it the crystalline principle referred to by Mr. T. S. Conard (*Pharm. Journ.*, [3], i., 866), though he differs from that observer as to the nature of it, being inclined to look upon it as an alkaloidal and not a neutral substance. It is obtained by treating a strong alcoholic tincture with subacetate of lead for removal of colouring matter, evaporating and treating the residue with benzol to free it from fat, subsequent digestion of it with alumina and crystallization from strong alcohol. Mr. Falck found that, although insoluble in hydrochloric acid, it dissolved in strong and in dilute sulphuric acid, the strong acid imparting to it, after a time, a brown colour, which upon the addition of potassium bichromate passed into yellow. An alcoholic solution was, if anything, slightly alkaline to test paper. When fused with pure potash the crystals gave off fumes that coloured red litmus blue and became white in contact with vapour of hydrochloric acid. A dilute sulphuric acid solution gave precipitates with chloride of gold and sodium, phosphomolybdic acid and potassium iodohydrargyrate, whilst an alcoholic solution gave precipitates with chloride of gold and sodium and with tannin. No attempt appears to have been made to test the physiological action of this crystalline compound, or to ascertain whether it represents the active principle of black snake root.

The root of another plant indigenous to the United States, the *Sanicula Marylandica*, Linn., sometimes used in the treatment of intermittent fever, and in Pennsylvania extensively as a popular remedy against consumption, has been examined by Mr. Houck (*Amer. Journ. Pharm.*, Sept., p. 463). No very definite results, however, appear to have been attained, but the conclusions arrived at were that the medicinal virtues of the root probably depend mainly on a volatile oil and resin, and that an alcoholic tincture seemed to contain all the desirable constituents in solution.

Mr. J. W. Colcord directs attention in the *National Druggist* (September, p. 110) to a new drug called "canutillo" (pronounced can-a-tele-yo), from Texas. In the neighbourhood of San Antonio in that State the plant is used by the native Indians and residents in the treatment of gonorrhœa, leucorrhœa and other mucous discharges and in renal disease. When bruised it is frequently used as a vulnerary and styptic, and it is given internally in the forms of an infusion and a fluid extract. Dr. Gleeson, of San Antonio, considers it almost a specific in gonorrhœa; one case is said to have been cured in three days after taking only one ounce of the fluid extract. Judging from specimens which have been forwarded to this country, "canutillo" is identical with *Ephedra trifurca*, a shrub belonging to the natural order *Gnetaceæ*. The plants of this genus consist of little more than wiry, jointed stems, the leaves being reduced to small scales; the male flowers are in catkins and the female flowers terminal on axillary stalks; the fruit is a succulent cone of two carpels, each containing one seed. The properties ascribed to the plant are such as are known to be possessed by other species of the genus. *E. flava* is used in China as an astringent in excessive perspiration; *E. antisyphilitica*, Berl., in Mexico, as a remedy for syphilis; *E. fragilis*, Desf., in Crete, as an astringent remedy for hæmorrhoids and mucous discharges. The fruits of *E. monostachya*, L., are used in Siberia in the form of jelly for catarrh, and a decoction for rheumatism and gout, and the twigs of *E. distachya*, L., in the south of Europe and in Japan for diarrhœa.

In the *Journal de Recife* (Oct. 31, 1883), published at Pernambuco, Dr. J. A. Velloso gives an account of the trials made with a new cancer cure. It consists of the milk of an Euphorbiaceous plant, belonging apparently to the section which has fleshy stems like the cactus. The plant is known by the name of "alvelós." Dr. Velloso tried it in the Hospital Pedroii, on two patients, one with a fibroplastic canceroid on the nose, and the other suffering from epithelioma of the lip, the first being cured in forty days and the second in less than two months. The best method of employing it is to apply a slice of the stem of the fresh plant to the part to be destroyed, and when it has deposited a layer of milk on the wound, the part affected is left exposed to the air twenty-four hours; subsequently the wound is washed with a tepid infusion of tobacco, and after some minutes covered with lint moistened with arnica and water. Twenty-four hours after it is again moistened with the same infusion and then a fresh application of the juice of the plant is made. No internal remedies are given. The action of the juice is irritating, causing a local inflammation, the intensity of which appears to be kept within proper bounds by the use of tobacco infusion.

THE CAUCASIAN PETROLEUM REGION.*

(*Concluded from page* 226.)

Not having yet visited any other places I shall confine myself to Balakhany and its neighbourhood. There are about four hundred wells on the area referred to, and this number is being constantly increased. The wells vary in depth considerably. Before boring was introduced they were from 30 feet to 150 feet deep, but now they go down as much as 700 feet. It may be said in passing that this would be considered a very moderate depth in America, where more than 3000 feet of soil have been successfully bored through. The boring system used is a modification of the American; sometimes ropes are used and sometimes thick iron drilling-rods. A heavy lever driven by a steam engine strikes the blows which force the chisel through the soil. All the wells are cased with tubing. The first series is made of wrought iron, is generally 15 inches in diameter, and goes down to a depth often of about 40 or 50 fathoms. When this pipe ceases to run down (each section of about 7 feet being rivetted to the preceding) another series, $12\frac{1}{2}$ inches in diameter, is introduced. When this in turn comes to a stop another series, $10\frac{1}{2}$ inches in diameter, is introduced. The last series of these concentric tubes is 8 inches in diameter; being made of thick "drawn wrought iron" force can be used if it should show signs of refusing to sink with the deepening of the bore.

The strata are so very irregular that it is impossible to predict the depth at which the oil will be found. The wells a few years ago were about 300 feet in depth. Afterwards 500 feet became the average. To-day the richest wells are those which are 600 feet in depth. The oil, being "struck," flows freely, and is drawn up in long and narrow buckets with a valve at the bottom by which it can enter as soon as the bucket reaches its surface. The valve closes, the bucket is drawn up with about 100 gallons, which run out when the bucket is allowed to come in contact with the channel which leads the oil to a rough reservoir banked with sand. Sometimes when the oil-bearing layer is reached the phenomena are very different from those now described. Gas is found in large quantities mingled with the oil, and this comes off with tremendous force and causes what is called a "fountain." Very startling were these fountains when first seen. With a loud roar the volume of oil rushes through the working scaffolding (technically known as a "derrick") which is 60 feet high. Fountains have been known to rise more than 200 feet (and that there should be no mistake on the subject they have been photographed), and their roar has been heard for miles around. And this prodigal discharge has not lasted for a few minutes, or hours only, but has gone on for weeks, and even months. With careful working the waste of oil from these fountains can be prevented by placing a cap on the tube of the well, having a valve which can be opened at pleasure. Mr. Nobel has about twenty-five of these fountains (of varying richness), capped over, so that he can draw oil from them as he wishes. But oil is so cheap at Balakhany (10 gallons costing 1*d.*), that Mr. Nobel often buys from others and prefers to keep his own wells untouched until some favourable opportunity should arise. In fact, by dint of the liberal expenditure of capital and by the employment of a staff of thoroughly scientific men, Mr. Nobel has gained a virtual monopoly of the industry. Nothing can be more striking to an Englishman than the intelligence displayed by those he finds in the employment of Mr. Nobel, and the secret is soon explained—they are not Russians. Seeking for trustworthy men, whose honesty and capacity could be depended on, Mr. Nobel had to bring them from Finland or Sweden. It would be hardly possible to show more clearly the great lack of honesty among the natives. But still a great improvement in the state of the country can

* From *The Times*.

also be deduced from this fact—now an honest man can succeed in business, until very recently he could not.

But to return from this digression. A few of these fountains have given quantities of oil so great as to seem fabulous. One of the most famous is that of the Droojba Company, the loss of oil from which raised much indignation in Russia. It belongs to an Armenian Company, which was almost ruined through the claims brought against it on account of the damage done to the neighbouring property by the overflow of oil. It is now surrounded by a huge bank of sand, which was thrown up with the oil. So great was the quantity of sand, that a house close to the well was quite buried. This fountain commenced to spout on August 18, and it continued until December 14. At first it gave 50,000 barrels in the twenty-four hours. This became gradually reduced to 25,000, then to 10,000 and to 8000, when at last it stopped. Two other wells belonging to Mr. Nobel—Nos. 9 and 25 gave almost similar quantities. While referring to the latter an interesting fact may be mentioned. This well still gives off gas at a very great pressure—a gauge has shown more than 200 lb. to the square inch—which has been used for drilling other wells instead of steam. The gas is simply led into the boilers and the pressure regulated by a stop-cock to 55 lb., and one can see the strange phenomenon of a steam-engine working with no fires beneath the boilers.—everything being perfectly cold. Stones have been thrown to a height of 900 feet by the pressure of the gas. Of course it was found that with such large quantities of oil gushing forth on the mere sinking of a well, the *boordooks* and the *arbas* were insufficient for the transport. Mr. Nobel accordingly laid a line of iron pipes, but this provoked the liveliest opposition from the Tartars and others who were engaged in the transport. So great, indeed, was their anger, that they threatened to destroy the pipe. Armed watchmen were accordingly placed in little stone houses—detatched forts, in fact—to guard the structure upon which depended the feeble life of the new born industry. In time, however, other capitalists followed the example of Mr. Nobel, and now there are about half a dozen pipes, of which the two largest belong to the gentleman who has been so often mentioned. The Tartars found other employment as the industry became developed, and now these watch-houses are going to ruin. Thus an uninterrupted supply of the oil was now guaranteed at Baku, where the refineries are situated, and whence the refined oil can be shipped to its destination.

The phenomena to be observed in the oil field of the Apsheron Peninsula are of extreme scientific interest as well as of commercial importance. The fountains of petroleum no less than the natural issues of gas will, no doubt, in time receive their proper explanation though they may now be clouded in mystery. As to the origin of petroleum there has been much speculation, but no theory has yet been found sufficient to account for all the facts as they are observed. The three chief theories may be stated in a few words. Considering that the various bodies found, in what we call petroleum, may be distilled from coal, bituminous shale, and other substances, it has been suggested that natural petroleum has been formed in this manner in the interior of the earth. The chief objections to this theory are that petroleum sometimes occurs in strata far below the coal measures, and sometimes far from the neighbourhood of these measures, and, again, that no coke or remains of such distillation is ever found. Next it has been suggested that the bodies of marine animals (the shells of which go to make up such large masses of rock) have, under the action of unknown forces in the interior of the earth, been decomposed into oil. In spite of the many objections that are urged against this theory it receives support from geologists of the very highest distinction. The third theory has been propounded by the Russian chemist, Professor Mendelejeff, whose name is well known in England. He suggests that petroleum has been formed by the action of water upon compounds of carbon with metals which occur in the basaltic and other rocks, and he gives various arguments in support of his ingenious theory. Professor Mendelejeff certainly has the advantage, possessed by few, of having studied the petroleum field in America as well as in Transcaucasia. Petroleum has also been attributed to comets, according to the custom recently prevailing of tracing many mysterious changes and events to these bodies, the composition and structure of which are as yet almost unknown.

Concerning the oil-field of the Apsheron Peninsula it may be asserted that neither has the geologist received decided confirmation or refutation of any of these theories, nor has he been able to direct the engineer in his search for oil. The general outline of the geological formation of the Apsheron Peninsula is simple, though the position of the strata in the oil-field is exceedingly complicated. So contorted, in fact, are the strata that hardly any induction can be drawn from them. According to Professor Abich, who studied the geological aspect of the region about twenty years ago, the rocks can be assigned to the miocene formation, of which two layers may be traced. Above these are tertiary clays and sands. The whole region has, moreover, been affected by volcanic agency; and the western limit of the Balakhany plateau rises into an extinct mud volcano at the apex of which a few small springs of mud and of petroleum still exist. This point is generally regarded as the centre of disturbance, for the strata slopes gently away from it to the south-east. Further to the south-east are more layers of limestone rising in cliffs when seen from the west, but sloping always to the south-east. The whole of the limestone is composed of the shells of molluscs. In general, it is very coarse, large shells entering into its composition, yet in some places it is of much finer texture; but even this stone (which resembles Bath stone in appearance) is so very soft that when it is used for building no other tool than an axe is applied to it. Some have suggested that the oil occurs above this limestone, which they say has been forced down to great depths by volcanic agency, while others say that it is where the limestone has been worn away by denudation that the oil-bearing strata are exposed. In fact, at the present moment very little is known about the matter, and geological opinions are hardly more than wild speculations. The fact of the oil being found in so recent a formation as the tertiary, while in America it is in the Devonian, and in Canada in the Silurian, may assist in taking away some of the mystery attached to its formation or it may make the mystery seem deeper. One remark may be hazarded—that wherever petroleum is found in the Caucasus the limestone in the neighbourhood is full of shells.

Though the Caucasian oil-field is probably of great extent this cannot be asserted positively. To lay claim to the term oil-field it is surely necessary that the oil must occur in quantity sufficient to make it worth the trouble of collecting it. In various places throughout the Caucasus, from the Taman Peninsula on the Black Sea to the Apsheron Peninsula on the Caspian, the oil oozes from the surface of the ground. In Daghestan especially is this the case. But there are no *data* to show whether these are isolated manifestations or whether they are connected by the extension of the same strata.

It is well known that oil may be found in large quantity at great depth, though no signs of it are seen on the surface of the soil; and, on the other hand, it may be found issuing out of the ground, though upon boring wells little satisfaction may be obtained from the result. The island of Tcheliken on the eastern side of the Caspian is known to be very richly endowed with petroleum, and the structure of this island may throw some light on the connection subsisting between the oil-bearing rocks of the whole region of the Caucasus and the Caspian. Unfortunately upon this point I must remain silent

Though invited by Mr. Nobel to visit the property which he possesses on that island, I was prevented when on the point of starting by the order of the Russian Government to the effect that no Englishman may be allowed to travel from Baku to Krasnovodsk or any of the Persian ports on the Caspian Sea. Further inquiries elicited the information that the order had been given directly from St. Petersburg, and, therefore, the local authorities were bound to resist any attempt I should make to visit the island of Tcheliken. Though doubtful of the legality of such action on the part of the Russian Government, I reluctantly refrained from visiting this island, my interest in which was enhanced by the prohibition against visiting it.

Even from the Balakhany plateau it is not easy to obtain geological *data*, for except Mr. Nobel no proprietor of any well seems to think it of any consequence to keep a record of the borings. But the tables prepared by Mr. Nobel from the boring records do not show any connexion between the strata bored through even in the case of wells only a few fathoms apart. There does not seem to be a gradation of oil-sands as in America, but a violent intermixture of the strata. Only in a very few cases has the oil supply from one well been interfered with by the deepening of a neighbouring well.

The oil as brought to the surface is a thick brown liquid, with a greenish tint when looked at from certain directions.* It differs in several material respects from the oil obtained in America. The specific gravity of the latter is 0·820 on an average, while that of the former is 0·872. The American petroleum is very much more rich in burning oil than the Caucasian, giving from 70 per cent. to 75 per cent. (*sic*), while the latter only yields from 25 per cent. to 30 per cent. The Caucasian is, however, more rich in the oils which are used for lubricating machinery. Material differences in chemical and physical properties of the components of the two oils also exist; but this is a subject which is only of interest to experts, among whom it must be acknowledged there also exists much difference of opinion.

The crude oil must be subjected to distilling and refining processes before being brought into the market. When distilled it yields the following substances, the percentage of which as given must be held as an average which may vary considerably:—Benzine and gasoline, 5 per cent.; kerosine, 28 per cent.; solar oil, 12 per cent.; spindle oil, 6 per cent.; lubricating oil, 12 per cent.; residue, 27 per cent.; loss from various causes, 10 per cent.—total, 100 per cent. In the Black Town of Baku there exists, it is asserted, about two hundred refineries, but at least three-fourths of these must be considered as almost, if not entirely, defunct, from causes which will presently appear.

The substances which have been given in the figures above are not what are called pure chemical compounds, but are mixtures of several of such. As in the majority of the refineries the only substance thought of is the burning oil, the kerosine, it is the endeavour of the manufacturers to produce as large a proportion of it as possible. If by the most carefully conducted operations only about 27 per cent. of this substance can be obtained, it is evident that one who sends forth 40 per cent. or 50 per cent. of his crude oil into the market as burning oil must have recourse to adulteration; and this is found to be the case. The volatile products, the benzine and gasoline, must be separated from an oil intended for lamps because of their explosive nature, and similarly the heavy lubricating oils cannot be used in lamps without causing smoke from imperfect combustion. Yet by a judicious mixture of these with the kerosine an oil can be made which may appear of good quality, but which is in reality not only bad but positively dangerous. The Russian Government, seeing the harm that is likely to accrue from the use of such bad oils, is about to follow the example of the Western nations, and to impose a certain standard "flashing-point."

One of the chief reasons for the prevalence of bad oil, and even of explosive oil, is the defective machinery possessed by the Baku refiners. Another is the cupidity of the Armenians, or perhaps the difficulty they have in competing against the more perfect appliances of Mr. Nobel. In reality this gentleman controls the whole industry, and affixes the price which he requires, subject only to the competition from America. Even from a distance of many miles at sea can the position of his great refinery with no smoke rising from it be distinguished from the countless number of other factories, each belching forth heavy clouds of black, suffocating smoke. And on entering the works it is seen that the arrangements and appliances which are found there are altogether superior to those which exist elsewhere. Thus one can readily believe that this refinery is producing more oil than all the others put together, while above it none of that noxious smoke is to be seen. The director is a gentleman from Finland, whose engineering talents are known to many in England, Mr. Gustavus Tornudd. In fact, many of the chiefs of departments have studied their respective branches in England, and it is in that language they speak as they show the visitor over the sections in charge of which they are placed. The order and regularity which bespeak the perfect organization are toned by the many picturesque features which can only be witnessed in this Eastern land. While the fire roars in the furnaces below the serried lines of stills, each fitted with a tube bearing the distillate to a distant receiving house, the attendant Tatar fireman may be seen squatting on the ground in a scorching heat complacently regarding the self-feeding fires. He has little to do, everything is done for him by machinery. The process of distillation is a continuous one; at one end of the series of stills the crude petroleum enters, and after flowing through each member in succession from which some new substance is separated, the residue emerges at the other end, and is run into a tank from which it is taken when required for fuel. The distillates after further processes of refining are ready for the market, in which they appear in two classes, burning oils and lubricating oils. But the operation of getting them into the market was involved with difficulties; no means of transport were available save small sailing vessels, the length of whose journey varied according to the mood of that most capricious of seas, the Caspian. In such circumstances Mr. Nobel resolved to construct steamers which should convey the petroleum not in barrels, as in the sailing vessels, but in great tanks. These vessels were constructed in Sweden, and after travelling through the Russian canal system at length appeared in the Caspian. At the present time twelve of these steamers are engaged in carrying the petroleum products to Russia, and they form a most important addition to the Caspian fleet, which embraces about seventy-five steamers in all. The remarkable manner in which the industry is being developed on this desert shore in the wild Caspian may be judged from the fact that a steamer can be laden with about 900 tons of petroleum in four hours and a half. Another use to which these vessels might be applied should not be forgotten in England. In the event of the Government requiring it, Mr. Nobel could land several thousand Russian soldiers on the further side of the Caspian at one voyage of his fleet. The development of the petroleum industry is thus not without its political significance. Up to the present time almost the whole of the petroleum sent from Baku has been transported over the Caspian to Russia. From the anchorages at the mouth of the Volga small steamers and barges take it up to the

* It may be interesting to mention that the Museum of the Pharmaceutical Society contains six specimens of "naphthas" and four of ozokerite from the Baku petroleum region, which were brought over from Russia by Mr. Greenish in 1880.—Ed. Pharm. Journ.

terminus of the railway at Tsaritsen, whence it is conveyed to a great central station at Orel, where large stores contain sufficient petroleum to supply light to Russia for the third part of a year. By his admirable organization, Mr. Nobel has supplanted American petroleum by Caucasian throughout Russia—a feat for which the Russian people may well be proud of their "oil king."

By the recent completion of the railway between Baku and Batoum the conditions of the development of the industry have been materially altered. The road to the Black Sea, and, therefore, to the Mediterranean, which has hitherto been closed, is now open, and along this road petroleum is beginning to pour into the countries washed by these seas. Circumstances seem to promise a brilliant future for this little port of Batoum, so picturesquely situated at the foot of the encircling hills. One obstacle, however, still remains to the rapid development of the transit in this direction, and that is the steep inclines in the Suram Pass, over which the railroad is carried. The gradient is said to be 1 in 22 ; the line is single, and two Fairlie engines are required to drag each train over the many miles of dangerous inclines. So seriously does this Pass affect the traffic that Mr. Tornudd tells me he can manufacture more petroleum products in two months than the railway can carry in a year at its present method of working.

Various schemes have been proposed to remedy this unfortunate state of affairs, and the one which will probably be adopted is that of a line of pipes from the bottom of the Pass at Suram, over the incline, and down on the other side to Batoum, a distance of upwards of 100 miles. Five or six pumping stations, it is said, would be required to force the oil from Suram down to the shore at the Black Sea through this length of pipe. It may be, however, a long time before this scheme can be put into shape, for the official forms in Russia are very tedious and the men in office wofully corrupt. Batoum was made a free port by the Treaty of Berlin, but this concession, which might have proved a blessing in other lands, has been the reverse of advantageous through the manner in which the necessary precautions against smuggling are carried out. To the transport traffic the ignorant strictness of the Russian officials of the Customhouse has proved very hurtful, while to the traveller it is exasperating. Hardly anyone has gained by the stipulations of the Berlin Treaty in regard to Batoum ; and it is understood here that these stipulations are to be cancelled very soon by the action of Russia.

The residue which is left after the refinement of petroleum accumulates in such large quantities that the refiners are forced to burn it merely to get rid of it; yet the part which it will play in the future as fuel may prove of great influence upon the march of commerce. In the autumn of 1881 there appeared in *The Times* certain articles upon Russia, and in one of these a description was given of the use of liquid fuel in the steamships on the Volga and the Caspian Sea, and the opinion was hazarded of the possible extension of this fuel into larger spheres. The years that have passed have amply justified this opinion, and now that the extreme value of this fuel is becoming generally recognized a few words may not be out of place upon this subject. More than twenty years ago the attention of engineers and others became directed to the residues left in the manufacture of gas and the distillation of shale, and various inventions were patented of forms of furnace to burn this fuel. Professor Macquorn Rankine brought this subject before the United Service Institution in 1865, and he was followed by Admiral Jasper Selwyn, who even succeeded in getting experiments performed at Woolwich Dockyard upon naval boilers. Public interest was the more readily aroused as Professor Stanley Jevons had recently drawn attention to the rapid exhaustion of the coalfields of Great Britain. The subject, however, gradually dropped out of sight again.

Napoleon III. noticed some forms of apparatus for burning liquid fuel in the Exhibition at Paris in 1867, and he commissioned H. Sainte Claire Deville to enter on an extended series of researches upon the value of different kinds of fuel, with special reference to petroleum and the various liquid residues. During the course of these investigations (the results of which were published from time to time in the *Comptes Rendus de l'Académie des Sciences*) St. Claire Deville entered into communication with some of the refiners of Baku, and an engineer was deputed to visit him. The outcome of this visit was the trial by the Caucasus and Mercury Company of an apparatus by which the petroleum residue (*astatki*) could be burned in the boilers of one of their ships for the generation of steam. So successful was the trial of this fuel that other steamers were provided with the apparatus, and at the present day no other fuel is used on the Volga (except high up the river, where wood is very cheap) and on the Caspian Sea. Before me are plans prepared by Mr. Goolishambaroff, of Tiflis, of upwards of fifty different forms of burners ; but the one in general use is that invented by an engineer of Baku named Lentr. It differs very slightly from the forms used twenty years before in England and America, and the principle is the formation of a spray of petroleum residue by a jet of steam from the boiler. Thus it is necessary to raise steam in the boiler by some other fuel before the petroleum steam jet can work; and the steam which goes to the formation of the spray, of course, is lost for the performance of work in the engine. Future improvements in the apparatus may, however, eliminate this loss of steam which at present seems requisite.

This drawback is small when the advantages of the liquid fuel are considered. Nothing can be more simple, more convenient, or more cleanly, than its use for all the applications for fuel for steamships, for metallurgic operations, or for household purposes. Captains and engineers alike speak in its praise, and none can be found to bring any charges against it. It would be difficult to find one who had used it who would wish to return to the use of any other fuel. In fact, the use of this fuel has ceased to be any other than a question of cost. Its advantages may be thus summarized. The simplicity of its use ; no attentive stoking is required, for the self-acting apparatus once set agoing continues for an indefinite time or until stopped. No cinders are produced and there ought to be no smoke. Its cleanliness—it is kept in cisterns, and is conveyed from these cisterns to the fires in pipes, from which no leakage should occur. Its safety—it need be hardly necessary to say that there is very little in common between the volatile kerosene and the thick viscid *astatki*, which can with difficulty be set on fire. And further, in the case of storms, the oil can be run out on the sea and the breakers are immediately changed to "rollers." In this way the captain of one Mr. Nobel's steamers claims to have saved his ship last year in spite of the scepticism which prevails upon this use of oil.

The chief advantage, however, of this fuel is its high thermal value, which is very nearly double that of coal. Lengthened experience shows that 65 pounds of this liquid fuel can raise as much steam as 100 pounds of coal. Or, putting it in another way, steamers which burn from 7 pounds to 8 pounds of coal per hour per horse-power burn from 4½ pounds to 5 pounds of petroleum residue. If we take into consideration the gain in bulk by using the petroleum residue, it is probably correct to say that the value of this latter fuel is more than double that of coal. The combustion of this fuel is more complete than that of coal, for there is little difficulty in getting 90 per cent. of its theoretical value. This is, therefore, of great value in various metallurgical operations where it is necessary to have a very high temperature. But it may be asked—of what value can this fuel be to British ships which must be brought from so great a

distance as the Caspian Sea? A little consideration will, however, show that the possible influence is not so very remote. At the present time coal is taken from England to the great depôts along the road to India and China. Very soon, however, the *astatki* will appear on the Black Sea, and contest the supremacy with coal; and before long the Mediterranean and the Suez Canal will also feel its influence. What will hasten on the competition is the fact that the apparatus being so simple and occupying so little bulk the boilers may be heated with either fuel at pleasure. And, as a vessel can steam two weeks with liquid fuel for one week with the same quantity of coal, the former can be double the price of the latter and yet compete with it. The Caucasian oil-field may not, and probably cannot, supply enough of this liquid fuel to have a very serious effect on the present commercial relations, but other oil-fields exist which have been worked to a very limited extent. Notably that of Burmah. The oil from Burmah is very similar to that of the Caucasus, being of high specific gravity and containing much of that heavy oil which cannot be used for lighting purposes. The Burmese oil-field is much less developed than the Caucasian, and it would be hazardous to venture on predictions, but it is within the bounds of possibility that, instead of accumulating large stores of coal at Singapore, the time may come when the petroleum of Burmah will be the fuel which shall bring home the wealth of India and the East. Thus, while in the future the Caucasus may prove a disturbing element to the supply of fuel for British ships being in British hands, in the more remote future the balance may be again restored.

THE BEE-KEEPING INDUSTRY IN AMERICA.*

BY JOHN L. DOW.

In nothing has there been greater progress displayed throughout America during the past half-dozen years than in the keeping of bees. Formerly success in bee-keeping was attributed largely to "luck," and the variety of systems practised by different bee-keepers was only equalled by the multiplicity of designs adopted in the construction of the hives. A specialty of the American farm, as seen to-day, is its apiary, as the rows of hives are called, which are marshalled along at distances of from five to seven feet from each other in some convenient situation near the garden or orchard. And what arrests attention is the similarity of pattern in these square white painted hives. From California to Massachusetts one would think that the keepers of bees had obtained their hives from one maker. You find, however, that nearly every State has its own special make of beehives, but the differences are only in detail, and do not interfere with the general plan that seems to govern these square boxes. We eventually discover that bee-keeping in America is now everywhere reduced to principles that are as much distinguished for their certainty of operation as formerly the occupation was noted for being one essentially of guesswork.

Although bee-keeping to the extent of apiaries comprising from a dozen hives or so up to about fifty is general among the farms and orchards, the big bee ranche, whose proprietor devotes his whole attention to the industry, is also quite an established American concern. It is estimated that for the year 1882 there were 70,000 bee-keepers in the United States, possessing among them a total of 2,000,000 hives, averaging 20 lbs. of honey each, which at the low average of 10 cents per lb. represented a total of 4,000,000 dollars, besides 20,000,000 lbs. of wax, worth 6,000,000 dollars, or a total for the year's crop of 10,000,000 dollars. Of these amounts, honey and wax to the value of 1,200,000 and 700,000 dollars respectively were exported for the same year. Among the bee-keepers in the Eastern States the work of what is called "wintering the colonies" is a very serious portion of the bee-keeper's responsibility; but in the more genial and Australian-like climate prevailing along the Pacific Coast, between San Francisco and Mexico, the bee industry is carried on under the most favourable conditions. In Los Angeles County, Southern California, there are two hundred apiaries, aggregating 12,000 hives, from which it is estimated that an average of 500,000 lbs. of honey is taken annually; and one large producer, Mr. J. S. Harbison, sent through to New York on one occasion a consignment of honey and wax amounting to ten car loads of 20,000 lbs. each or 200,000 lbs. in all. Among individual yields vouched for at Los Angeles is one where from a single hive during the season 566 lbs. of honey was taken, some of which, owing to its purity and the superior manner in which it was got up for market, reached 50 cents per lb.

The square box form of the hives that has already been alluded to was adopted as far back as 1851, almost about the same time by the American and German bee-keepers, Langstroth and Dzeron respectively, to admit of working their movable comb improvement, an invention which has led the way to all the recent bee-keeping improvements. It is strange that the complete revolution in bee management effected by the early discoveries of these two men should only have taken place within the past few years; and it is no less notable that in 1883 the Langstroth hives are making their way all over America with little alteration in their design to those first submitted by Mr. Langstroth in 1851. Instead of the old straw hive, in which the bees were smothered previous to the honey being promiscuously tumbled out, all mixed up with larvæ, wax and broken comb, the modern hive is fitted with square frames, which can be lifted out and dropped in again at will just as panes of glass are handled in a glazier's box. These frames are what the bees build their comb upon, and set to work at filling with "extracted" or "box" honey respectively, just as their owner may desire.

Extracted honey is that which is separated from the comb, and box honey the kind that is sold in boxes holding a pound or so of honey, and in the form that it comes from the hive. For extracted honey, full sized frames are used in the hive, but for box honey the frames are subdivided into the boxes within which the bees are to construct the honey-filled comb in the shape intended for market. When the full frames are charged with honey, another achievement in the new bee-keeping system is brought into operation, viz., the honey extractor. This is an ingenious contrivance, resembling in appearance the square frame of a street lamp, the sides of which are fitted with honey-charged frames from the hives, and the whole then inserted within an enclosure like an oil drum, fitted with a tap. The apparatus, with its frames of honey, is fitted into pivots above and below, and is then swiftly rotated by a tooth and pinion attachment. The honey, by centrifugal force, is thus thrown from the frames, and is drawn off by the tap in the enclosing drum.

"Comb foundation" is another of the improvements. The bees, it appears, if left to themselves, not only occupy too much of the honey-making season in comb building, but also work up too much valuable material to suit the commercial notions of the modern bee manager. Honeycomb is made of pure wax, which the working bees exude from minute folds of their bodies in the shape of thin flakes or scales. It is estimated that every square inch of comb built by the bees is done at the expense of from fifteen to twenty times its weight in honey. Thus the bee-keeper resorts to comb foundation, and by saving the bee the work of making it, obtains the extra honey. A little machine with iron rollers, resembling in form the wringer in a clothes

* From the *Leader*. Reprinted from the *Tropical Agriculturist*, August 1, 1884.

washer, is used to roll out beeswax into thin sheets of comb foundation. These are fastened on the frames, and the frames dropped into their places in the hive, when the bee proceeds at once to business.

At first, comb foundation was not a success, and it was discovered that the hitch occurred in the sheets being rolled out plain. The bees would not work because they could find no trace of cells. Then an enterprising inventor engraved his rollers, so as to stamp the sheets of beeswax with a perfect imitation of the bees' cells, when, thenceforth, the busy little insects buckled down to work with as much satisfaction as if they had made the sheets themselves. Some bee-keepers roll out their own foundation, but most obtain it from one of the many suppliers of bee-keeping requisites that are to be found all over the United States. Here is one of their advertisements:—"We are prepared to promptly fill all comb foundation orders at the following prices—one to ten lb., 55 cents per lb.; fifty lb. or over, 50 cents per lb.; 100 lb. or over, 45 cents per lb. Our largest sheets are 12 × 12 inches, and run from 5 to 8 square feet to the pound. In ordering give inside dimensions of frames. If ordered by mail add 25 cents per pound to above charges for postage and extra packing; samples by mail, post paid, 5 cents."

Another triumph of the new system is the "smoker," by which the most nervous person can handle and work among the bees with the utmost safety. Formerly a few individuals in a locality were regarded with considerable veneration, owing to their possession of a supposed mysterious influence that prevented bees from stinging. The whole art of bee taming is now found to consist in the fact that bees will not sting when filled with honey; that to get them to fill themselves it is necessary to frighten them, and that the necessary frightening is effected by puffing a little smoke into their hives. For this purpose the smoker, which is a pointed tin funnel filled with smouldering rags and having a small bellows attached, forms one of the bee-keeper's indispensable tools of trade. The handy manner in which the bees can be inspected by puffing a little smoke into the hive, and then lifting out any section of the movable combs, enables the condition of the colonies to be constantly noted.

The first step on the part of new beginners in bee-keeping is to post themselves in the interesting study of bee physiology by obtaining one of the numerous books on the subject. The best works among American publications are:—King's 'Bee-Keeper's Text-Book,' Langstroth's 'Bee Book,' Quinby's 'New Bee Keeping,' Roots's 'A. B. C. of Bee Culture,' and Cook's 'Bee Keepers' Guide.' A prosperous hive or colony of bees consists of a fertile queen, a few hundred drones and about 40,000 workers. The queen is the prolific parent of the whole colony, and laying eggs is the sole end of her existence. In the height of the honey gathering season, and under favourable circumstances, the queen will deposit about three thousand eggs per day. She is distinguished from the other bees by being larger and having smaller wings. The drones are bulkier than the queens, but shorter, and have large wings, but are destitute of a sac for carrying honey and incapable of performing the duties of the workers. Their business is the fertilization of the queens, and as impregnation is effected while on the wing, the drones leave the hives in considerable numbers about noon on fine days, and are followed by the young queens. When the service of fertilization is supposed to be accomplished the workers drive out the drones and keep them out till they die of starvation.

One of the many advantages of working the movable comb hive is that all excess of drone comb (which differs from the honeycomb) can be removed, and the production of useless consumers thus kept in check. The workers are the smallest in size of the three classes of bees, and, although females, are incapable of fertilization by the drones, so that, although they occasionally lay eggs, these never produce working bees. Upon the workers devolve all the labour of building comb, collecting the honey and feeding the queen and brood. Their average age varies from a few weeks in summer to from six to nine months during the remainder of the year. The queen's average age is from three to four years, and should her death occur the workers construct large cells, supplying them with what is described as "royal jelly," so that the eggs or larvæ that otherwise would have produced worker bees are developed into queens. Only one queen is allowed to remain in each hive. The queen usually leaves the hive when about five days old to meet the drones in the air for fertilization, which, being accomplished, serves her for life, as she seldom afterwards leaves the hive, excepting in company with her first swarm.

The average time from the laying of the egg to the appearance of the perfect insect is for the queen sixteen, for the worker twenty-one, and for the drone twenty-four days respectively. The cells in which the workers are reared are the smallest in size; those for the drones nearly one-third larger, and for the queen still larger and of peculiar form, requiring as much material for their construction as fifty worker cells. In strong colonies, having plenty of stores, the queen will often deposit eggs during every month in the year, the least brood being during the three winter months. On the approach of spring an increase of brood rapidly sets in, and the bee-keepers prepare for their annual harvest of swarms and surplus honey. From three to ten queen cells are generally constructed in each hive, and in about eight days after the first queen leaves with the first swarm the next queen is ready to emerge from her cell.

An important feature in connection with the movable comb system of bee management consists in the old chance method of swarming being supplanted by what is called artificial swarming. Instead of the bees being left to swarn naturally, with the risk of being lost, the swarming is conducted at the will of the operator by the removal of the queen to a new hive, where she is followed in the most docile manner by the swarming bees. Another important advantage that the new system of bee-keeping affords consists in what is called nucleus swarming, by which a queen is reared amid a small cluster of bees in a separate hive until she matures and becomes fertilized, when the hive that is to be swarmed is shifted, and the nucleus hive put in its place. In this way the surplus bees from the shifted hive go out as usual, to their work of honey gathering, and according to the law which directs them back to the exact spot of their old habitations, take possession of the new hive, and continue their operations under the new queen that they found established there to receive them. The chief gain made by this expedient is one of time, a commodity that is of special value during the honey season.

The introduction of a fertile queen to a colony is often in this way effected a fortnight earlier than they would swarm naturally, and this in a large apiary amounts to a very considerable aggregate gain. Sometimes the facilities presented by the movable comb system are called into requisition for quite a contrary operation, viz., the prevention of swarming when an increased amount of honey may be desired instead of multiplied stocks. When this is the case the frames are lifted out until the queen is found, when one of her wings is clipped, thus preventing her from flying away, and consequently putting a stop to the swarming. In preparing for wintering the bees also it is a common practice to join two colonies, so as to get through the non-producing season upon the most economical terms; a full hive, owing to being able to maintain the proper degree of warmth, requiring less food. All such handlings as these various processes involve are enabled to be carried out under the movable comb system with the utmost certainty and exactness of operation. Further details with respect to varieties of bees, bee pasturage, and other matters, will have to be dealt with in another paper.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 27, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelop s indorsed "Pharm. Journ."*

THE POSSIBLE DEVELOPMENTS OF PHARMACY.

THE apparent inconsistency of requiring proof of having undergone a scientific training from a man who may have to spend the greater part of his time in competing with the grocer or drysalter, or even with the linendraper, for the favour of the public has been a fertile theme for complaints that have no small share of justification in facts. Over and over again, however, it has been urged in these columns that this scientific training should be considered a means of lifting the pharmacist occasionally out of the miserable and disheartening competition involved in the trading phase of his calling, and by enabling him to break fresh ground on the professional borderland secure for him a better position both from a monetary and social point of view. It is true that there has been a certain amount of shyness in adopting these views; whilst to decry them as utopian has had the immediate reward in popularity that usually follows appeals to the pessimist side of human nature. Nevertheless, there are still some, and we believe this number is increasing, who adopt the more sanguine view, and who have no doubt in their own minds, should the prognostication come true that the result will be to divide the body of chemists and druggists into scientific pharmacists and drysalters, as to which division they will cast their lot in with. Any at rate, however this may be in Great Britain, in Continental countries pharmacists are undoubtedly availing themselves of every opportunity to put in evidence the special nature of the services they are competent to render to the community, especially in matters relating to the public health, and their energy does not always remain without suitable recognition.

An instance of this occurred a few days since in Berlin, where the German Sanitary Association has been holding an important meeting. The first sitting was occupied with the question of the promotion of instruction in hygiene, and the reporter, Professor PFLUGGE, of Gottingen, had urgently recommended the foundation of a hygienic institute and the initiation of a practical course of hygiene for medical officials. In the discussion which followed, Dr. BLASIUS, teacher of hygiene in the Brunswick Polytechnic, called attention to the assistance to hygienic efforts which pharmacists, above all persons, are capable of rendering, and which, he said, might be raised to a still higher degree of value by a suitable education of the younger members of the body. Incidentally, Dr. BLASIUS mentioned that it was from the ranks of pharmacy that the greatest of hygienists, Dr. PETTENKOFER, had come, and he reported specially, as the result of his experience at the Brunswick Polytechnic, where there are a considerable number of students, that he found in that institution pharmacists were among the most eager attendants at the hygienic lectures and excursions. He said he believed that even in the immediate future, whilst yet there was no staff of thoroughly trained hygienic officials, pharmacists would be of extraordinary importance to the country in connection with practical hygiene, since their training fitted them for chemical investigations, whilst it was a common custom, in the absence of a medical man or an officer of health, to seek advice from the pharmacist upon many questions. In small places, where the pharmacist might have much time upon his hands, he would be capable of carrying out such investigations for the adjoining districts, and he recommended, therefore, that in the education of pharmaceutical pupils special attention should in future be paid to hygiene.

Whilst writing upon this subject it is only fitting to refer to the vast importance that in Germany is now attached to the science of hygiene, which found expression a short time ago in the great sanitary exhibition held in Berlin. Another proof of it is supplied in the organization of a Hygienic Institute in the University of Berlin, to the superintendence of which the now celebrated Dr. KOCH has been appointed. As this new institute is to be modelled upon the existing Physiological Institute, some idea may be gathered as to the manner in which it is to be carried on, and the details are interesting. In the first place the Physiological Institute is conducted on thoroughly decentralizing principles. It consists of four independent and spacious departments, devoted respectively to chemistry, physics, microscopy and experimental investigation. Each department is presided over by its own teacher, but in order to secure that the studies are not made too special the whole establishment is under the scientific and administrative control of a director. In a less degree it is the business of this official to see that the studies in each department are kept within proper limits, and that the whole of the work done bears upon it the stamp of the science to which the institute is dedicated. Hygiene is the fourth of the medical faculties for which shelter has been now found in Berlin. The first originated in the physiological laboratory started in 1853 by DU BOIS RAYMOND and removed to its present home twenty years afterwards. Then came the Pathological Institute, founded in 1856 by Professor VIRCHOW in connection with the Charité Hospital. Next in order followed the Pharmaco-

logical Institute, which was finally completed only about a year ago and is now under the direction of Professor LIEBREICH. Whether the existing Health Exhibition in London will yield results comparable to those following its more severe predecessor in Berlin can at present be only the subject of prophecy, but it may be hoped that, should the opportunity occur, British pharmacists will prove themselves equally prompt with their German brethren to manifest their fitness and willingness to render to the community such services in connection with hygiene as comes within the lines of their scientific training.

The First Evening Meeting of the Pharmaceutical Society in the new session will be held on Wednesday next, on which occasion the Council prizes and those awarded to successful students in the Society's School of Pharmacy will be distributed by the President, after which an Address to Students will be delivered by Mr. W. T. Thiselton Dyer, Assistant Director of the Royal Gardens, Kew. The chair will be taken at half-past eight o'clock.

* * *

The fatal case of poisoning mentioned a fortnight since as having occurred in Philadelphia, through a competitive swallowing of pills which contained strychnine, has entailed some inconvenience to the drug clerk that dispensed them. The pills were dispensed upon a physician's prescription and were plainly labelled, but the box was not marked "poison" and the "drug clerk" has therefore been held by the coroner to be responsible for the death. The dictum of this functionary has not, however, been allowed to pass unchallenged, and at a meeting of Philadelphia druggists held to protest against it a letter was read stating that the physicians of the city supported the pharmacists in their protest, claiming that a pharmacist had no right to label as poison a medicine dispensed on a physician's prescription, since many patients would refuse to take medicine so labelled. These views were also endorsed by some physicians present at the meeting, one of them declaring that he would put up his own prescriptions rather than allow such an abuse of the poison label. There can be little doubt as to the soundness of the protest, and in our own Pharmacy Act the point is specifically dealt with.

* * *

The meeting of the American Association for the Advancement of Science, held in Philadelphia in the beginning of the present month, is said to have been attended by a larger number of home and foreign scientists than any of its predecessors. As to the papers it was announced at the opening meeting that more than two hundred had been received.

* * *

Some of the leaders of the American Association seem not to be averse to the exercise of the scientific imagination, if we may judge from an address of Professor Cope in the biology section. Assuming as established the proposition that life has preceded organization in order of time, Professor Cope said hat it is a "safe inference" from what is known, hat the earliest forms of life were the rhizopods, whose organization is not even cellular and inudes no organs (*sic*) whatever." The question hen arises how the distinction between the two prinpal lines of development was originally roduced, and the process, the professor thinks, is not difficult to imagine. In one case the "plastid" dissolved the salts of the earth and appropriated the gases of the atmosphere, building up for itself out of these materials more protoplasm and "raising the type of energy from the polar non-vital to the adaptive vital by the process." In this way the dead mineral world is presumed to have been transformed into the earliest form of vegetable life, which is, however, supposed to have since lost consciousness, and become parasitic, automatic and degenerate. As to the animal line, Professor Cope thinks it may have originated in this wise. Some individual "protists," perhaps accidentally, devoured some of their fellows and the experience in nutrition proving easy and pleasurable was repeated until it became a habit. The energy thus economized in the ordinarily laborious process of making protoplasm was available as a vehicle of an extended consciousness, which the animal, unlike his spendthrift vegetable neighbour, has never lost, but in some cases "specialized into more or less mind." If this theory be correct, an outbreak of cannibalism is, after all, only an instance of atavism.

* * *

At the recent general meeting of the German Pharmaceutical Association it was resolved that in each district steps should be taken for the formation of a joint committee of medical men and pharmacists for the purpose of combating the nostrum trade. Such a committee has been in existence for some time past in the district of Mecklenburgh, where its efforts are said to be successful in keeping the local newspapers entirely free from advertisements of nostrums, and this committee is to be taken as a model for the new ones.

* * *

In a lecture delivered a few days since in Berlin upon the artificial colouring substances, Dr. Schultz, said that out of seventy establishments now engaged in the manufacture of coal tar colours forty were located in Germany, the explanation being that in that country the science of chemistry has been most carefully fostered as a means of promoting manufacturing industry.

* * *

In a recent report on the trade of Taiwan Mr. Consul Gregory speaks of the use of a substance known as "sesamum-seed cake" for adulterating opium. This article is mentioned in the lists as an import from other Chinese ports, and appears to be of the nature of an inspissated juice or extract. It is said to be free from feculent matter, tasteless and inert; but it is credited with the property of heightening the "touch" of the opium with which it is mixed. Notwithstanding the name, local attempts to prepare such a substance from sesame seed, which is plentiful in the district, have entirely failed.

* * *

We have received from Messrs. Martin and Sallnow, of 416, Strand, copies of a series of twelve very successful photographs, taken by permission, of the exterior and different parts of the interior of the house of the Pharmaceutical Society, in Bloomsbury Square, including the laboratory, museum, lecture theatre, etc. Probably there are some of our readers who would like to possess copies of these photographs and it may therefore be convenient to mention that a complete set may be obtained for half-a-guniea at the address given above.

British Pharmaceutical Conference.

TWENTY-FIRST ANNUAL MEETING.

(*Concluded from p.* 239.)

Note on the Presence of Copper in some Pharmaceutical Preparations.

BY JOHN R. HILL.

The objects of the following note are to bring before the Conference a contamination of certain pharmaceutical preparations with copper, which, so far as I am aware, has not been previously observed, and to raise the question, What is the most suitable material for the construction of pharmaceutical apparatus employed in the manufacture of the preparations referred to?

It is the outcome of an incident which occurred in ordinary practice, and I have thought it would be an advantage to bring the subject under the notice of those whose experience and opportunities are such as may give rise to profitable discussion.

A considerable time ago I discovered that a sample of infusum rosæ acidum concentratum contained a quantity of copper sufficient to speedily coat a steel spatula which had been accidentally immersed in it. The infusion had been prepared in a jacketed copper pan, and this, no doubt, was the source of the contamination.

I started to make a quantitative estimation according to the following process:—200 grains of the infusion were evaporated to dryness and ignited. The residue was dissolved in dilute hydrochloric acid and the copper precipitated in the metallic state by the addition of pure zinc. From want of time the process was not carried further, and the matter was allowed to drop. I have not had a convenient opportunity of making a quantitative estimation since, and I regret that I am, therefore, unable to give an exact statement of the proportion of copper present in any of the preparations to which I shall allude. Judging from the appearance of the precipitate, however, I should say that the proportion did not exceed, and was probably less than, 1 per cent.

A few months ago my attention was again directed to the subject by the following circumstance. While dispensing a prescription it was necessary to slightly evaporate a quantity of ergotin. A silver-plated spatula, from which some of the plating had been rubbed off, was used to stir the mass, and it was observed that the steel surface thus exposed became covered with a distinct film of metallic copper. An examination of the ergotin showed that it contained a notable quantity of copper, which could be readily detected by any of the ordinary tests, and that it was present apparently in even larger proportion than in the infusion of roses above referred to.

Just at that time an interesting practical paper on "Pharmaceutical Apparatus" was read before the Liverpool Chemists' Association by Dr. Symes (*Pharm. Journ.*, vol. xiv., p. 783). In that paper jacketed copper pans are recommended, and this fact coupled with the observations I have just mentioned led me to examine a considerable number of pharmaceutical preparations in order to ascertain to what extent the use of such pans was the cause of the contamination which it is a purpose of this paper to point out. The result was to show that the vast majority of the commercial samples of concentrated decoctions, fluid extracts and concentrated infusions so examined, readily gave unmistakable indications of the presence of copper to a greater or less extent.

The iron test was the one generally employed, and was applied as follows:—200 grains of the preparation were placed in a test tube and slightly acidulated with hydrochloric acid. A 5 inch piece of recently polished No. 36 iron wire, in the form of a small coil, was immersed in the liquid, which was then gently boiled for about ten minutes; allowed to stand for other ten minutes, and the liquid poured off. If any appreciable quantity of copper was present it was at once detected as a deposit on the coil of iron wire, the copper colour being more or less distinct according to the respective extent of the contamination.

This simple and old-fashioned test seems to me to have several advantages. It it capable of ready and expeditious application; the presence of organic matter being no obstacle. Its indications are indisputable. It is sufficiently delicate for all practical purposes, and where it fails to give a perceptible indication the preparation may be regarded as practically free from contamination. By exposing a constant surface of iron to equal weights o substance it is possible, from the colour of the cupreous deposit, to obtain a rough approximation to the relative degree of contamination.

The various preparations examined with the result in each case may be conveniently tabulated as follows:—

Preparation.	Copper deposit.
Ergotin	Abundant.
Infus. rosæ acid. conc.	,,
,, chirettæ ,,	,,
,, cuspariæ ,,	Very distinct.
Ext. cinchonæ liquid.	,, ,,
Infus. cinchonæ conc.	Distinct.
Ext. ergotæ liquid	,,
Infus. digitalis conc.	,,
,, senegæ ,,	,,
Decoct. sarzæ co.	,,
Infus. serpentariæ	,,
Decoct. pareiræ conc.	,,
Infus. gentianæ conc.	Less distinct.
Ext. sarzæ liquid	,, ,,
Ext. taraxaci liquid.	,, ,,
Ext. sennæ liquid.	,, ,,
Decoct. scoparii conc.	,, ,,
Infus. Cascarillæ ,,	,, ,,
,, calumbæ ,,	,, ,,
,, uvæ ursi ,,	Perceptible.
,, quassiæ ,,	None.

The above is a graduated series, the ergotin indicating the largest proportion, and infus. uvæ ursi conc. the least. Infus. quassiæ conc. is included in the list because even when prepared in a copper vessel it does not indicate any contamination. It is probable that the degree of contamination in the above preparations may be due to accidental circumstances, and that were they all prepared under precisely similar conditions the series would require considerable rearrangement. It would appear that substances containing principles belonging to the tannin group are most liable to contamination, while those containing neutral or comparatively indifferent principles are less so. The very considerable contamination of ergotin is probably due to the phosphoric and other mineral acids present in the ergot.

It has been found by Dupré and Odling, Bergeron and Hôte, and Kingzett that copper, in small quantities, is widely distributed in nature and is a normal constituent of many vegetable and animal tissues. I may, therefore, be met by the objection that what is here called a contamination is, after all, nothing more than what has been called "normal copper." On this point it is sufficient to say that many of the samples of these preparations gave no indications of the presence of copper, and wherever it was possible to trace the manufacture of such as did indicate contamination it was found that copper pans had been used in their production. It seems clear, therefore, that the copper is not inherent, but derived, and that the evaporating pan is the source.

It may be interesting to note that samples obtained from large manufacturers, possessing well equipped pharmaceutical laboratories, frequently indicated contamination; while those obtained from smaller establishments, as a rule, did not. I believe this is to be accounted for by the fact that in the smaller establishments it is customary to conduct the process of

evaporation in an ordinary enamelled iron evaporating basin heated by a Bunsen burner, while in the larger establishments jacketed copper pans, heated by steam, are in more general use.

In regard to the poisonous effect of copper, authorities appear to differ widely, as may be seen from the discussions which have taken place on the presence of copper in green peas and other articles of food (*Pharm. Journ.*, vol. viii., page 236). The conclusion arrived at by Paul and Kingzett as to the innocuous nature of traces of copper in foods appears to be too sweeping. The weight of evidence tends to show that copper is an irritant poison and that while many appear to tolerate it even in considerable quantity others are peculiarly susceptible to its poisonous effects.

In the case of ergotin there is a point of some importance which would probably be worth investigation. It is very frequently administered by subcutaneous injection and in this way the copper is introduced directly into the blood. It has been found that some samples of ergotin are much more liable to produce local irritation than others when so administered, and it seems possible that this may be due to the presence of copper in the ergotin. I am acquainted with one make of ergotin in the production of which no copper vessels are employed, consequently it gives no indication of contamination, and one of its principal recommendations is its freedom from liability to produce local irritation.

With regard to the sale of pharmaceutical preparations contaminated with copper I quote the following remark by Professor Redwood (*Phar. Journ.*, vol. viii., page 235): "He had come to the conclusion that no dealer or manufacturer was justified in supplying an article of food (or, by parity of reasoning, a drug) which contained an unnecessary addition of a poisonous substance, without notice being given of its presence." This gives rise to an interesting speculation as to the probable result of a prosecution under the Sale of Food and Drugs Act.

Apart from this, however, the practical question naturally arises, Are copper vessels suitable for the processes involved in the production of the pharmaceutical preparations referred to? Or, to put it in a more comprehensive form, What is the most suitable material for the construction of such pharmaceutical apparatus?

To the first question I would be inclined to answer—No. The copper pans described in Dr. Symes's paper are only jacketed on the lower part, and he justly claims for them the advantage of not causing deterioration of the product by drying and destruction of active principles at the margin. They would probably have the additional advantage of not so readily contaminating the product with copper. I believe it is mainly at the margin, where the liquid, the metal and the atmosphere meet, that contamination goes on. The drying of the liquid on the metal is attended by a certain amount of oxidation, and the oxide of copper thus produced is dissolved by a fresh portion of liquid. So much for the first question.

The second is not so easily settled, and I fear I must leave it to those who have a more extensive practical acquaintance with the subject. Copper vessels tin lined, such as those described by Mr. Corder, of Norwich, in the *Pharmaceutical Journal*, vol. viii., page 349, might perhaps meet the difficulty. Silver, or some variety of nickel plating, may also be suggested. I believe that in one establishment block tin pans are in use. Best of all, perhaps, is the jacketed enamelled iron pan, described by Mr. Schacht, at the Plymouth Conference in 1877 (*Pharm. Journ.* vol. viii., p. 127).

Votes of thanks were passed to the authors.

The PRESIDENT, referring to the last paper, said the subject was a very important one and deserved more attention that could be given to it there at that late hour. It was a very curious thing that the author should find that ergotin was so active in dissolving copper. He should like to know if the ergotin was obtained by the usual process.

Mr. DOTT said this paper was very interesting; considering the poisonous nature of copper salts it was very important that its presence in pharmaceutical preparations should be avoided. There was probably no other metal which could be used practically in large vessels for evaporating, and this indicated the necessity for the copper being coated with some material on which the organic acid would not act.

Mr. NAYLOR said all this difficulty might be avoided by using tinned copper pans, which were now becoming very general.

The PRESIDENT remarked that sometimes the tin got worn off a little.

Mr. PLOWMAN thought this was not the time or place to discuss the question whether the presence of copper was harmful or not, but he quite agreed with the author that copper ought not to be present in quantity in food and drugs. He could not agree with Messrs. Paul and Kingzett in their opinion that a considerable amount of copper could be taken into the system without doing harm.

GENERAL BUSINESS.

Bell and Hills Library Fund.

Mr. PLOWMAN said the books provided by the Bell and Hills Fund were placed on the table. The fact had already been alluded to that the visit of the Conference had caused an association to be formed in Hastings. He might say that when he came down on previous occasions to make arrangements he found that a local association had been conceived, but it was not actually born. But it only required a slight stimulus from the visit of the Conference to cause the Association to spring into life. These books were given from a fund provided by the generosity of Mr. Thomas Hyde Hills. There were also the 'Pharmacographia' and the 'Science Papers,' presented by Mr. Thomas Hanbury in memory of his brother, and besides these there was the 'Year Book of Pharmacy,' which the Conference itself granted to the new Association, and would continue to send from year to year.

The PRESIDENT, addressing Mr. Rossiter and the members of the local Association, said it gave him great pleasure in his official capacity to hand over this handsome array of books to the keeping of the new Association, now being formed in Hastings, and he hoped that they would form a nucleus for that instructive library which he had no doubt would be established.

Mr. F. ROSSITER, on behalf of the Hastings Chemists and Druggists' Association, begged to return most sincere thanks for this handsome set of books. In the first place thanks were due to the Conference for having been the means of establishing an association to which alone the grant could be made, and further he might say the chemists of Hastings should almost pass a vote of thanks to the British Association for going to Canada this year, for had its meeting taken place in any town in Great Britain, Hastings would not have had the distinguished honour of the Pharmaceutical Conference meeting there. He could only say with regard to the active part which Mr. Plowman had been kind enough to give him credit for in the formation of the Association, that he must disclaim having exceeded in any way what had been done by several other members, especially Mr. Bell. For some time there had been a talk of forming an association in Hastings—and it must seem strange that an ancient town, which in times past had shown such energy and spirit, had, so far as regards pharmacy, allowed other towns to lead the way. He must admit that for some time they had been living in a sort of fossil state, not perhaps quite so petrified as the fossil to which Mr.

Keyworth had referred that morning, but ready to spring into active existence at the touch of the magician's wand, such as was furnished by the visit of the Conference. These handsome books would form a nucleus of a library, and he was sure it would be a pleasure to all the members to make additions to it as time went on, and they would at all times, looking at these books, feel a great incentive to do what they could for pharmacy and for their brother pharmacists, and would be reminded of this happy occasion.

Place of Meeting for 1885.

Mr. Benger said it would be remembered that the Conference had received an invitation to go to Aberdeen this year, which was withdrawn because the British Association proposed to meet there next year. That invitation had been very cordially renewed, and he had a letter from Mr. Strachan, Honorary Secretary of the Aberdeen Society, which he would read. Mr. Kay had come all the way from Aberdeen to offer personally a renewal of the invitation, but he wished him to read a letter which he received from Mr. Strachan a few days ago. It was as follows:—"I expect Mr. Kay will be present at your Conference, but if he is unable you will understand that our invitation is none the less hearty because it is in black and white instead of *vivâ voce*. Our endeavour will be to make the meeting as interesting as we possibly can.—Yours truly, H. Strachan."

Mr. Kay begged to thank the meeting very much for the warm reception given to this proposal. He did not know if this expression of feeling was due to any merits Aberdeen might possess, or to the present state of the atmosphere, which made them all feel that it would be pleasant to get a few degrees nearer the North Pole, —which they certainly would be in crossing the Grampians. He felt that Aberdeen as a watering place had no such attractions as Hastings and St. Leonards, but it was an ancient university city and claimed to be the capital of the North of Scotland. It had one advantage over Hastings, a Chemists' Association had been established in Aberdeen for nearly fifty years. This Associa- had been of great advantage to the chemists, and had done very good work in the district, if it had not made its name known in the south. A few of the original members, who assisted Jacob Bell in the formation of the Pharmaceutical Society, were looking forward to meeting many who were associated with them in this great work. This Conference had given him an opportunity of meeting a few old friends and many gentlemen, also, who were only known to him previously by reputation. He knew it was the desire of the chemists in the north to make the acquaintance of gentlemen eminent in their profession, whom they highly respected for their efforts in forwarding the interests of pharmacy. The medical profession in the district were also interested in, and looking forward to the visit of the Pharmaceutical Conference. He need not repeat that it would be a very great pleasure indeed to see as many as possibly could come, and they would try to make the visit as pleasant as possible.

Mr. Benger moved that the kind invitation received from Aberdeen be gratefully accepted. They had had very pleasant meetings in some of the Scotch cities and towns before, and he was sure they would look forward very much to this visit next year.

Mr. Plowman seconded the motion.

The President said the time would be fixed hereafter when the exact date of the meeting of the British Association was known.

The resolution was then carried unanimously.

Election of Officers.

Mr. Radley and Mr. Clark were appointed scrutineers of the ballot papers.

The President said it would be observed that certain alterations of a very serious character had been made in the list of officials; he alluded more especially to the fact that the Conference was about to lose one of the General Secretaries who had been for so many years connected with them, Mr. Benger. It was with great reluctance that the Conference heard that Mr. Benger could no longer fulfil the duties of the office. Dr. Thresh had been named as a substitute, and he had no doubt he would prove a most efficient one, but he must say personally he was very sorry the change had occurred during the time of his presidency. Misfortunes never came alone, and not only did Mr. Benger retire, but their old and tried friend, Mr. Ekin, who had been Treasurer for the last seven years, also found it impossible to continue to carry out the duties of his office as he would wish, and it was his desire also to retire. This was an office which, perhaps, could be filled more easily than that of General Secretary, whose work extended over a much longer period than that of Treasuer, whose duties were really confined to a short period, whereas the General Secretary required constant energy and attention throughout the whole year. It would be for the members present to say if they would elect the gentlemen suggested, viz., Mr. Umney as Treasurer and Dr. Thresh as Secretary. In the meantime he could only express the great regret which he himself felt at the loss of these two gentlemen, who had so worthily filled those two offices, and he begged formally and emphatically to move a vote of thanks to these gentlemen for their services to the Conference in past years.

Mr. Schacht said he felt it a great privilege to be allowed to second this vote of thanks. These gentlemen were amongst his oldest professional friends, and it gave him great pleasure to second this motion. It would have been much more pleasing if one could have thanked them for their past services before they altogether got out of harness; but unfortunately one had to say goodbye at the same time, and the satisfaction of saying "thank you" was sadly mingled with regret at the necessity for parting with such excellent fellow-labourers. Whilst Mr. Benger was Honorary Secretary one felt there was no occasion to think about the details of the business arrangements, for the Conference was almost certain to go well, wherever it was held, so long as he and his colleague had the direction of affairs, and the other members of the Committee felt relieved of a great deal of responsibility. Notwithstanding the abilities of Dr. Thresh, who was proposed to succeed him, he felt they must all be a little more anxious in future as to the success of the meetings, and it would become more the duty of every individual member to exert himself than it had been in the past. There were men who were respected and men who were loved, and it was just possible that the latter were the most powerful in all organizations that aimed to control human beings. Both Mr. Ekin and Mr. Benger were men of this order, and, though thanking them warmly for their services in the past, he could not help expressing real sorrow that the Conference was about to lose them for the future.

Mr. Plowman said he could not allow the opportunity to pass without saying a few words. With regard to the general loss which the Conference had sustained by the retirement of these two gentlemen, he need not add one word to what had been said, but he should like to say a few words on the personal aspect of the question. When he took office three years ago it was with considerable diffidence, but his hesitation was entirely removed after a brief experience of his colleagues. The cordial way in which Mr. Benger met and helped him, and actually took on his own shoulders burdens which properly belonged to him (Mr. Plowman) was such that he was happy to say he had been able to do his share of the work with very little trouble or inconvenience to himself. They had worked together with the most complete harmony during the whole of this time, and he was pleased to say that their intercourse on Conference business had more closely cemented a friendship whic

had previously existed, and which he hoped would last as long as life itself.

The resolution having been carried unanimously,

Mr. BENGER said he was quite overcome by the kind things which had been said about him. Only one thing would have added to his gratification, and that would be a knowledge that he had better deserved what had been said. The mere fact of having served rather actively as Secretary a body which had done so much to advance pharmacy and to promote good feeling and good fellowship amongst pharmacists was in itself a full reward. This he had constantly realized as the work went on. He looked forward with full confidence to the future of the Conference, so long as such men as his energetic and accomplished friends Mr. Plowman and Dr. Thresh were at the helm: but should always look back with very much pleasure to the thirteen years in which he had served it to the best of his ability.

The Scrutineers here returned and reported that the following gentlemen had been unanimously elected:—

President.—J. B. Stephenson, Edinburgh.

Vice-Presidents.—F. Baden Benger, F.C.S., Manchester; M. Carteighe, F.I.C., F.C.S., London; C. Ekin, F.C.S., London; J. P. Kay, Aberdeen.

Treasurer.—C. Umney, F.I.C., F.C.S., London.

General Secretaries.—S. Plowman, F.I.C., M.R.C.S., London; J. C. Thresh, D.Sc., F.C.S., Buxton.

Other Members of Executive Committee.—S. R. Atkins, Salisbury; J. A. Bell, Hastings; J. Borland, F.C.S., F.R.M.S., Kilmarnock; J. E. Brunker, M.A., Dublin; W. Hills, F.C.S., London; D. B. Dott, F.R.S.E., Edinburgh; W. A. H. Naylor, F.C.S., London; J. Sim, Aberdeen; W. H. Symons, F.C.S., F.R.M.S., London.

Local Secretary.—A. Strachan, Aberdeen.

Auditors.—H. J. Joseph, Hastings, and J. Paterson, Aberdeen.

Mr. ATKINS then moved—

"That the cordial thanks of the non-resident members of the British Pharmaceutical Conference be given to the Local Committee, especially to Messrs. Bell, Rossiter, Keyworth and Joseph, for the very successful manner in which the arrangements connected with the Hastings visit had been carried out."

He was almost afraid to add anything for fear of weakening the force of this well-drawn resolution. It would be ungenerous to allow those services which had been so generously and courteously rendered to be acknowledged in a mere formal manner. The Local Committee had had the good fortune of having good weather; whether they had taken any special pains to secure that he did not know, but they certainly had had a meeting which he ventured to think would go a long way to solve the still open question as to whether a good meeting could be realized apart from the visit of the British Association. That was a question on which there would be perhaps a diversity of opinion, but in so far as the action and co-operation of the Local Committee were concerned there could be no doubt whatever left. He felt that this resolution was slightly premature, inasmuch as some of the social features of the gathering had yet to be realized, but inasmuch as gratitude had been defined as a lively sense of favours yet to come there would be no inconsistency in passing the resolution at this early stage. He knew personally how indefatigable had been the energy of the gentlemen whose names had been mentioned, and he had no doubt that the others associated with them had been equally zealous. Those who had come some distance to the meeting felt under great obligations to them, and he begged to assure them that he represented the opinion of all non-resident members in thanking them, however inadequately, for their kindness.

Mr. WELLS (Dublin) had great pleasure in seconding the vote of thanks, though anything he might have said in support of it had already been anticipated by Mr. Atkins. With regard to the success of the meeting he thought this year's was hardly a fair specimen, because there had been several conferences held within the last few weeks, but for which two other gentlemen from Dublin would have accompanied him. He begged to heartily thank the Local Committee for the way in which the Conference had been received.

The resolution having been carried unanimously,

Mr. J. BELL, in response, said as they had yet the social aspect of the question to look forward to it would be far better for him to leave the expressions he might wish to give until afterwards.

Mr. F. ROSSITER said he was not prepared for this vote of thanks, as he felt all through that the Conference had done the town a great honour in coming, and he could safely say for the whole of the Committee that it had been a work of great pleasure to them. So far from it being any trouble it was only a little pleasurable excitement, and if there had been any little error or forgetfulness, he hoped it would be kindly excused.

Mr. KINNINMONT then moved—

"That the hearty thanks of the Conference be accorded to the President, for the very able and courteous manner in which he has conducted the business of the meeting."

He said with regard to his ability there could not be two opinions, and as to his courteousness, no one could surpass him in such a position. From the time he first took his place until the present moment, he had distinguished himself for his kindness, ability, skill in saving time, and saying exactly what should be said. His address, which had before been referred to, was most valuable, and he had remarked on this as on previous occasions when he met Mr. Williams, how courteous he was in listening patiently to all the remarks which were made, many of which must seem a great repetition to him, but that did not prevent him listening to them patiently once more.

Mr. TYRER seconded the vote of thanks. He said reference had been made to the social qualities of Mr. Williams, and though his personal acquaintance with him was of somewhat recent date, from what he had heard and seen, he could most emphatically endorse all that had been said. Mr. Williams was one of the few men who cultivated the art of speaking the absolute truth in the pleasantest possible way. He spoke with the air of a man who believed all he said, and his words carried conviction with them. The effect left on his mind was that when Mr. Williams should have ceased to actively exert an influence—a great personal as well as a great scientific influence based on his experience and reputation—it would be thoroughly understood that al the cconiums passed upon him certainly fell short of the truth. With regard to the introductory address, they had been reminded that it was a return to the good old practice. He was not at all sure that it was so, for there were disadvantages in having a mere hash up of what everybody knew, as he was bound to say some of the presidential addresses had been; but he very much doubted whether all or any of them recollected or had read or knew all the facts which Mr. Williams brought within a narrow and clear compass in such a way as those who had any memory at all, or any scientific recollection, or any scientific use of the imagination, would ever retain a vivid impression of. It was a most valuable and suggestive address. There were two or three points in it which had brought back to him scattered recollections of good resolutions which they all knew paved the road to a certain place which might be the Hades of the destruction of fortune, or loss of one, and when a man of Mr. Williams's experience gave a youngster like himself, who sometimes wanted them, hints of this kind, he was profoundly grateful to him, and judging that other people were like himself he could only suppose they would sympathize with him, and cordially support the expression of gratitude he personally felt for the suggestiveness and appropriateness

of that address. With regard to the way in which Mr Williams had filled the post of President of the meetings he only regretted that what seemed to have been a common practice, to re-elect the President for a second year, had not been followed in this case, and he presumed there were reasons why Mr. Williams could not be prevailed upon to continue office as so many eminent men had done before. He knew none of them except Mr. Reynolds and Professor Attfield, and therefore he might be excused if he said emphatically that he only knew of them as historical pharmacists, and by the work they had done, but none of them stood higher in the estimation either of pharmacists or of practical men than did Mr. Williams.

Mr. FRAZER said having sat for ten years side by side with Mr. Williams at the monthly meetings of the Council of the Pharmaceutical Society, he could not refrain from adding just a word to say how deeply he sympathized with what had been said, and what gratification it had given him to be present during those two days.

Mr. ATKINS also desired to support the resolution. He felt it would be a great neglect if they allowed such services as the Chairman had rendered to pass without a very warm and widespread recognition. He had known Mr. Williams many years on the London Council, and could bear testimony to all that had been said as to his straightforwardness, and to his great liberality, a feature perhaps which had not been recognized, for only those who knew something of his private life knew the generous acts of liberality he was constantly rendering. He entirely agreed with previous speakers as to the kindly way in which he listened to all criticisms, whether relevant or irrelevant; all that they knew, but he was glad to have this opportunity of bearing testimony to the weight of the words uttered yesterday in the President's address. The highest compliment they could pay to it was to read it carefully and to well weigh it, for he felt sure that all those utterances would bear frequent reperusal. That address was not simply a *résumé* of great and extensive reading, of large and very wide personal observation and experimental work, but it was the result of long patient digestion of the works of a vast field of inquiry, and he took it as a high compliment to the members of the Conference that a man like Mr. Williams, so busy and full of work, should have taken pains, thoughtfully and deliberately, to prepare that address for their consideration.

Mr. SCHACHT said the motion of course could not be put from the chair, and therefore as the senior Vice-President he would assume that function. At the same time he wished to say how completely he agreed with every word of approbation that had been said with regard both to the President's address and his conduct in the chair. It might be thought to be a perfectly easy thing to sit in a chair and to conduct a meeting like that, and he was foolish enough to think so himself until he found by experience how much more difficult it was than it appeared to be. He had never seen the meetings of the Conference conducted with more courtesy, delicacy, and tact, than the present. With regard to the address it seemed to him to be a masterpiece of judicious exposition and thought; although it touched on some delicate and serious matters it carefully avoided any extreme expression of opinion, such as might be calculated in some quarters to raise opposition. That reticence of expression and self-restraint he thought showed more power than more vehement language would have done. He was sure the proposition would be carried by acclamation.

The resolution was carried by acclamation.

The PRESIDENT, who was much affected by the warmth of the reception accorded to the resolution, said: Gentlemen I thank you. To say that I could listen unmoved to such expressions would be affectation.

The British Association for the Advancement of Science.

SECTION B.—CHEMICAL SCIENCE.

OPENING ADDRESS.

BY PROF. SIR H. ENFIELD ROSCOE, PH.D., LL.D., F.R.S., F.C.S.,

President of the Section.

With the death of Berzelius in 1848 ended a well-marked epoch in the history of our science; with that of Dumas—and, alas! that of Wurtz also—in 1884 closes a second. It may not perhaps be unprofitable on the present occasion to glance at some few points in the general progress which chemistry has made during this period, and thus to contrast the position of the science in the "Sturm und Drang" year of 1848, with that in the present, perhaps quieter, period.

The differences between what may probably be termed the Berzelian era and that with which the name of Dumas will for ever be associated show themselves in many ways, but in none more markedly than by the distinct views entertained as to the nature of a chemical compound.

According to the older notions, the properties of compounds are essentially governed by a qualitative nature of their constituent atoms, which were supposed to be so arranged as to form a binary system. Under the new ideas, on the other hand, it is mainly the number and arrangement of the atoms within the molecule which regulate the characteristics of the compound, which is to be looked on not as built up of two constituent groups of atoms, but as forming one group.

Amongst those who successfully worked to secure this important change of view on a fundamental question of chemical theory, the name of Dumas himself must first be mentioned, and, following upon him, the great chemical twin-brethren, Laurent and Gerhardt, who, using both the arguments of test-tube and of pen in opposition to the prevailing views, gradually succeeded, though scarcely during the lifetime of the first, in convincing chemists that the condition of things could hardly be a healthy one when chemistry was truly defined "as the science of bodies which do not exist." For Berzelius, adhering to his preconceived notions, had been forced by the pressure of new discovery into the adoption of formulæ which gradually became more and more complicated, and led to more and more doubtful hypotheses, until his followers at last could barely succeed in building up the original radical from its numerous supposed component parts. Such a state of things naturally brought about its own cure, and the unitary formulæ of Gerhardt began to be generally adopted.

It was not, however, merely as an expression of the nature of the single chemical compound that this change was beneficial, but, more particularly, because it laid open the general analogies of similarly constituted compounds, and placed fact as the touchstone by which the constitution of these allied bodies should be ascertained. Indeed, Gerhardt, in 1852, gave evidence of the truth of this in his well-known theory of type, according to which, organic compounds of ascertained constitution can be arranged under the four types of hydrogen, hydrochloric acid, water, and ammonia, and of which it is, perhaps, not too much to say that it has, more than any other of its time, contributed to the clearer understanding of the relations existing amongst chemical compounds.

Another striking difference of view between the chemistry of the Berzelian era and that of what we sometimes term the modern epoch is illustrated by the so-called substitution theory. Dumas, to whom we owe this theory, showed that chlorine can take the place of hydrogen in many compounds, and that the resulting body possesses characters similar to the original. Ber-

zelius opposed this view, insisting that the essential differences between these two elements rendered the idea of a substitution impossible, and notwithstanding the powerful advocacy of Liebig, and the discovery by Melsens of reverse substitutions (that is the re-formation of the original compound from its substitution-product), Berzelius remained to the end unconvinced, and that which was in reality a confirmation of his own theory of compound radicals, which, as Liebig says, "illumined many a dark chapter in organic chemistry," was looked upon by him as an error of the deepest dye. This inability of many minds to see in the discoveries of others confirmation of their own views is not uncommon; thus Dalton, we may remember, could never bring himself to admit the truth of Gay-Lussac's laws of gaseous volume-combination, although, as Berzelius very truly says, if we write *atom* for *volume* and consider the substance in the solid state in place of the state of gas, the discovery of Gay-Lussac is seen to be one of the most powerful arguments in favour of Dalton's hypothesis.

But there is another change of view, dating from the commencement of the Dumas epoch, which has exerted an influence equal, if not superior, to those already named on the progress of our science. The relative weights of the ultimate particles, to use Dalton's own words, which up to this time had been generally adopted by chemists, were the equivalent weights of Dalton and Wollaston, representing, in the case of oxygen and hydrogen, the proportions in which these elements combine, viz., as 8 to 1. The great Swedish chemist at this time stood almost alone in supporting another hypothesis; for, founding his argument on the simple laws of volume-combination enunciated by Gay-Lussac, he asserted that the true atomic weights are to be represented by the relations existing between equal volumes of the two gases, viz., as 16 to 1. Still these views found no favour in the eyes of chemists until Gerhardt, in 1843, proposed to double the equivalent weights of oxygen, sulphur and carbon, and then the opposition which this suggestion met with was most intense, Berzelius himself not even deigning to mention it in his annual account of the progress of the science, thus proving the truth of his own words: "That to hold an opinion habitually often leads to such an absolute conviction of its truth that its weak points are unregarded, and all proofs against it ignored." Nor were these views generally adopted by chemists until Cannizaro, in 1858, placed the whole subject on its present firm basis by clearly distinguishing between equivalent and molecular weights, showing how the atomic weights of the constituent elements are derived from the molecular weights of their volatile compounds based upon the law of Avogadro and Ampère, or where, as is the case with many metals, no compounds of known vapour-density exist, how the same result may be ascertained by the help of the specific heat of the element itself. Remarkable as it may appear, it is nevertheless true that it is in the country of their birth that Gerhardt's atomic weights and the consequent atomic nomenclature have met with most opposition, so much so that within a year or two of the present time there was not a single course of lectures delivered in Paris in which these were used.

The theory of organic radicals, developed by Liebig so long ago as 1834, received numerous experimental confirmations in succeeding years. Bunsen's classical research on cacodyl, proving the possibility of the existence of metallo-organic radicals capable of playing the part of a metal, and the isolation of the hydrocarbon ethyl by Frankland in 1849, laid what the supporters of the theory deemed the final stone in the structure.

The fusion of the radical and type theories, chiefly effected by the discovery in 1849 of the compound ammonias by Wurtz, brings us to the dawn of modern chemistry. Henceforward organic compounds were seen to be capable of comparison with simple inorganic bodies, and hydrogen not only capable of replacement by chlorine, or by a metal, but by an organic group or radical.

To this period my memory takes me back. Liebig at Giessen, Wöhler in Gottingen, Bunsen in Marburg, Dumas, Wurtz, and Laurent and Gerhardt in Paris, were the active spirits in Continental chemistry. In our own country, Graham, whose memorable researches on the phosphates had enabled Liebig to found his theory of polybasic acids, was working and lecturing at University College, London; and Williamson, imbued with the new doctrines and views of the twin French chemists, had just been appointed to the Chair of Practical Chemistry in the same College, vacant by the death of poor Fownes. At the same time, Hofmann, in whom Liebig found a spirit as enthusiastic in the cause of scientific progress as his own, bringing to England a good share of the Giessen fire, founded the most successful school of chemistry which this country has yet seen.

At the Edinburgh meeting of this Association in 1850 Williamson read a paper on "Results of a Research on Etherification," which included not only a satisfactory solution of an interesting and hitherto unexplained problem, but was destined so exert a most important influence on the development of our theoretical views. For he proved, contrary to the then prevailing ideas, that ether contains twice as much carbon as alcohol, and that it is not formed from the latter by a mere separation of the elements of water, but by an exchange of hydrogen for ethyl, and this fact, being in accordance with Avogadro's law of molecular volumes, could only be represented by regarding the molecule of water as containing two atoms of hydrogen to one of oxygen, one of the former being replaced by one of ethyl to form alcohol, and the two of hydrogen by two of ethyl to form ether. Then Williamson introduced the type of water (subsequently adopted by Gerhardt) into organic chemistry, and extended our views of the analogies between alcohols and acids, by pointing out that these latter are also referable to the water-type, predicting that bodies bearing the same relations to the ordinary acids as the ethers do to the alcohols must exist, a prediction shortly afterwards (1852) verified by Gerhardt's discovery of the anhydrides. Other results followed in rapid succession, all tending to knit together the framework of modern theoretical chemistry. Of these the most important was the adoption of condensed types, of compounds constructed on the type of two and three molecules of water, with which the names of Williamson and Odling are connected, culminating in the researches of Brodie on the higher alcohols, of Berthelot on glycerine, and of Wurtz on the dibasic alcohols or glycols; whilst, in another direction, the researches of Hofmann on the compound amines and amides opened out an entirely new field, showing that either a part or the whole of the hydrogen in ammonia can be replaced by other elements or elementary groups without the type losing its characteristic properties.

Again, in 1852, we note the first germs of a theory which was destined to play an all-important part in the progress of the science, viz., the doctrine of valency or atomicity, and to Frankland it is that we owe this new departure. Singularly enough, whilst considering the symmetry of construction visible amongst the inorganic compounds of nitrogen, phosphorus, arsenic, and antimony, and whilst putting forward the fact that the combining power of the attracting element is always satisfied by the same number of atoms, he does not point out the characteristic tetrad nature of carbon; and it was not until 1858 that Couper initiated, and Kekulé, in the same year, thoroughly established, the doctrine of the linking of the tetrad carbon atoms, a doctrine to which, more than to any other, is due the extraordinary progress which organic chemistry has made during the last twenty years, a progress so vast that it is already found impossible for one individual, even though he devote his whole time and energies to the task, to master all the details,

or make himself at home with the increasing mass of new facts which the busy workers in this field are daily bringing forth.

The subject of the valency of the elements is one which, since the year above referred to, has given chemists much food for discussion, as well as opportunity for experimental work. But whether we range ourselves with Kekulé, who supports the unalterable character of the valency of each element, or with Frankland, who insists on its variability, it is now clear to most chemists that the hard and fast lines upon which this theory was supposed to stand cannot be held to be secure. For if the progress of investigation has shown that it is impossible in many instances to affix one valency to an element which forms a large number of different compounds, it is also equally impossible to look on the opposite view as tending towards progress, inasmuch as to ascribe to an element as many valencies as it possesses compounds with some other element, is only expressing by circuitous methods what the old Daltonian law of combination in multiple proportion states in simple terms. Still we may note certain generally-accepted conclusions: in the first place, that of the existence of non-saturated compounds both inorganic and organic, as carbon-monoxide on the one hand, and malic and citraconic acids on the other. Secondly, that the valency of an element is not only dependent upon the nature of the element with which it combines, but that this valency is a periodic function of the atomic weight of the other component. Thus the elements of the chlorine group are always monads when combined with positive elements or radicals, but triad, pentad, and heptad with negative ones. Again, the elements of the sulphur group are dyads in the first case, but tetrad and hexad in the second. The periodicity of this property of the atoms, increasing and again diminishing, is clearly seen in such a series as—

$$AgCl_1,\ CdCl_2,\ InCl_3,\ SnCl_4,\ SbH_3,\ TeH_2,\ IH,$$

as well as in the series of oxides. The difficulties which beset this subject may be judged of by the mention of a case or two:—Is vanadium a tetrad because its highest chloride contains four atoms of chlorine? What are we to say is the valency of lead when one atom unites with four methyls to form a volatile product, and yet the vapour-density of the chloride shows that the molecule contains one of metal to two of chlorine? Or, how can our method be said to determine the valency of tungsten when the hexachloride decomposes in the state of vapour, and the pentachloride is the highest volatile stable compound? How again are we to define the point at which a body is volatile without decomposition?—thus sulphur tetrachloride, one of the most unstable of compounds, can be vaporized without decomposition at all temperatures below $-22°$, whilst water, one of the most stable of known compounds, is dissociated into its elements at the temperature of melting platinum.

But, however many doubts may have been raised in special instances against a thorough application of the law of valency, it cannot be denied that the general relations of the elements which this question of valency has been the means of bringing to light are of the highest importance, and point to the existence of laws of Nature of the widest significance; I allude to the periodic law of the elements first foreshadowed by Newlands, but fully developed by Mendelejeff and Lothar Meyer. Guided by the principle that the chemical properties of the elements are a periodic function of their atomic weights, or that matter becomes endowed with analogous properties when the atomic weight of an element is increased by the same or nearly the same number, we find ourselves for the first time in possession of a key which enables us to arrange the hitherto *disjecta membra* of our chemical household in something like order, and thus gives us means of indicating the family resemblances by which these elements are characterized.

And here we may congratulate ourselves on the fact that, by the recent experiments of Brauner, and of Nilson and Pettersen respectively, tellurium and beryllium, two of the hitherto outstanding members, have been induced to join the ranks, so that at the present time osmium is the only important defaulter amongst the sixty-four elements, and few persons will doubt that a little careful attention to this case will remove the stigma which yet attaches to its name. But this periodic law makes it possible for us to do more; for as the astronomer, by the perturbations of known planets, can predict the existence of hitherto unknown ones, so the chemist, though, of course, with much less satisfactory means, has been able to predict with precision the properties, physical and chemical, of certain missing links amongst the elements, such as ekaluminium and ekaboron, then unborn, but which shortly afterwards became well known to us in the flesh as gallium and scandium. We must, however, take care that success in a few cases does not blind us to the fact that the law of Nature which expresses the relation between the properties of the elements and the value of the atomic weights is as yet unknown; that many of the groupings are not due to any well-ascertained analogy of properties of the elements, and that it is only because the values of their atomic weights exhibit certain regularities that such a grouping is rendered possible. So, to quote Lothar Meyer, we shall do well in this, as indeed in all similar cases in science, to remember the danger pointed out in Bacon's aphorism, that "The mind delights in springing up to the most general axioms, that it may find rest, but after a short stay here it disdains experience," and to bear in mind that it is only the lawful union of hypothesis with experiment which will prove a fruitful one in the establishment of a systematic inorganic chemistry which need not fear comparison with the order which reigns in the organic branch of our science. And here it is well to be reminded that complexity of constitution is not the sole prerogative of the carbon compounds, and that before this systematization of inorganic chemistry can be effected we shall have to come to terms with many compounds concerning whose constitution we are at present wholly in ignorance. As instances of such I would refer to the finely crystalline phosphomolybdates, containing several hundred atoms in the molecule, lately prepared by Wolcott Gibbs.

Arising out of Kekulé's theory of the tetrad nature of the carbon atom, came the questions which have caused much debate among chemists: (1) Are the four combining units of the carbon atom of equal value or not? and (2) Is the assumption of a dyad carbon atom in the so-called non-saturated compounds justifiable or not? The answer to the first of these, a favourite view of Kolbe's, is given in the now well-ascertained laws of isomerism; and from the year 1862, when Schorlemmer proved the identity of the hydrides of the alcohol radicals with the so-called radicals themselves, this question may be said to have been set at rest; for Lossen himself admits that the existence of his singular isomeric hydroxylamine derivatives can be explained otherwise than by the assumption of a difference between each of the combining units of nitrogen, and the differences supposed by Schreiner to hold good between the methyl-ethyl carbonic ethers have been shown to have no existence in fact. With respect to the second point the reply is no less definite, and is recorded in the fact, amongst others, that ethylene chlorhydrin yields on oxidation chloracetic acid, a reaction which cannot be explained on the hypothesis of the existence in ethylene of a dyad carbon atom.

Passing from this subject, we arrive, by a process of natural selection, at more complicated cases of chemical orientation—that is, given certain compounds which possess the same composition and molecular formulæ but varying properties, to find the difference in molecular structure by which such variation of properties is determined. Problems of this nature can now be satisfactorily solved, the number of possible isomers foretold, and this prediction confirmed by experiment. The general method

adopted in such an experimental inquiry into the molecular arrangement or chemical constitution of a given compound is either to build up the structure from less complicated ones of known constitution, or to resolve it into such component parts. Thus, for example, if we wish to discriminate between several isomeric alcohols, distinguishing the ordinary or primary class from the secondary or tertiary class, the existence of which was predicted by Kolbe in 1862, and of which the first member was prepared by Friedel in 1864, we have to study their products of oxidation. If one yields an acid having the same number of carbon atoms as the alcohol, it belongs to the first class and possesses a definite molecular structure; if it splits up into two distinct carbon compounds, it is a secondary alcohol; and if three carbon compounds result from its oxidation, it must be classed in the third category, and to it belongs a definite molecular structure, different from that of the other two.

In a similar way orientation in the much more complicated aromatic hydrocarbons can be effected. This class of bodies forms the nucleus of an enormous number of carbon compounds which, both from a theoretical and a practical point of view, are of the highest interest. For these bodies exhibit characters and possess a constitution totally different from those of the so-called fatty substances, the carbon atoms being linked together more intimately than is the case in the latter-named group of bodies. Amongst them are found all the artificial colouring matters, and some of the most valuable pharmaceutical and therapeutical agents.

(*To be continued.*)

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Permanganate of Potash Pills.

Sir,—As several of your correspondents have honoured my letter with their notice, I should like, if you will allow me, to reply on one or two points.

Mr. Martindale thinks the pill prepared with wax would pass disintegrated through the human system. I think not; for I have this day immersed a pill (which had been made seven months) in cold water, and in an hour and a half nearly all the permanganate dissolved out. If this be the result with cold water, what must the effect be when submitted to a warm stomach?

Mr. Hill has found the method adopted by me te give fairly satisfactory results, but finds the kaolin form far preferable. Well, I will not contest the point; but I may say my object in publishing my experience was to give an easy, handy form to country chemists, many of whom have never been asked to dispense it at all yet, but who may be ere long.

In reference to Mr. Martin's letter I would suggest that his varnish is insoluble, for he says he has suspended a pill made with wax in water at 100° F. for six hours, and no permanganate dissolved out, even when the varnish is slightly scratched off; then it seems the varnish is insoluble after being immersed in hot water for six hours. I have sent half a dozen pills, unvarnished, which have been made seven months, to Mr. Martin, which I trust will convince him at all events of the practicability of the wax process.

In conclusion I have only to add that if wax is so objectionable in these pills, it is high time the official form for pil. phosphori was altered, although I have never heard any complaints about their indigestibility.

45, *Lowgate, Hull.* Edward Ryley.

Destruction of British Flora.

Sir,—Now, when agitation is the fashion in almost every department, it is no wonder that some effort is being made to enlist sympathy on behalf of our rare plants, many of which appear to be losing ground to such an extent as to be threatened with total extinction.

To *Cypripedium*, *Adiantum*, *Hymenophyllum*, *Serapias*, etc., mentioned by your correspondent, Mr. Mumbray, numerous examples might be added. For instance, the pretty little *Woodsia*, which the hands of the Vandals have almost decimated in Teesdale; *Ceterach officinarum*, now totally lost to Wensleydale; and *Smilacina bifolia*, of which every plant that has the temerity to blossom is at once eagerly secured by collectors, and which, but for its rapid root propagation, would long ago have ceased to adorn the glades of Forge Valley with its delicate leaves.

But it is not the dealers only who are to blame for thus diminishing the number of our indigenous species. I think some portion of blame must rest on the botanist, plant collector, herbarium maker, call him what you will.

Some of these individuals collect large numbers of rare plants for purposes of exchange, and some, I have been told, actually destroy large patches of rarities, for the express purpose of rendering the few mummies they preserve more valuable to other collectors. How far this is true I am unable to say.

It is chiefly among the ferns that the dealer works havoc. One old gentleman of this class used to be very familiar to me, and many times have I seen him out in the wildest parts of Yorkshire, armed with spade, trowel and basket, in search of the curly *Allosorus crispus*, or the delicate *Cystopterus* and *Asplenium*. To many North Yorkshire botanists the name of Richard U——y will be familiar, for he was a character in his way, and understood a little about botany, notwithstanding his short-sighted policy in trying to eradicate the rarities of the district.

But who can object to the dealer exercising a calling in itself perfectly legitimate?

A calling, too, which may be said to be needful and praiseworthy, inasmuch as it supplies a decided demand, and enhances the pleasure of hundreds of dwellers in our large towns. Mr. Heath, the well-known writer on ferns, in a letter to the *Daily News*, suggests that a remedy might be found for this wholesale destruction, in a law prohibiting the removal of plants above a certain size from their native haunts. I fear this would hardly save some of our greatest rarities, many of which are of but small size when fully grown.

I think it would be well if an Act could be obtained, entirely prohibiting the removal of the rarer species, and a list of those protected drawn up, as is done in the "Wild Birds Protection Act."

I am very glad to observe that many landowners are very jealous guardians of the treasures which grow on their estates.

With such a law as the above in force, the commoner and equally beautiful species would be left to gladden the eyes of "those who dwell in cities," and the dealer would no doubt find it to his own advantage to take only young plants, as they bear removal better, and are better appreciated by the purchasers, who would rather watch and nurture their tender wildings from youth to maturity, than buy the fully developed plants, only to see them droop and die.

South Parade, Northallerton. J. A. Wheldon.

E. Weaver.—We believe the physician mentioned has left London and is now resident in Bournemouth.

C. A. Griffiths.—We know of no authority for such a quotation.

Export.—See a letter on the subject, before, vol. xiv. p. 916.

W. T. Scholes.—The Secretary to the Institute of Chemistry is Mr. C. E. Groves, and the offices are in Somerset House Terrace, W.C.

S. W. Marlor.—(1) Probably *Sedum Telephium*, but it is impossible to say without leaves. (2) *Stachys sylvatica.*

J. Hutchinson.—(1) *Polygonum Hydropiper.* (2) *P. Persicaria.* (3) *Senecio aquaticus.* (4) *Gnaphalium uliginosum.* (5) *Sonchus oleraceus.* (6) *S. asper.*

Umbelliferæ.—The fruit of *Daucus Carota.*

G. Bridges is recommended to apply to Professor Attfield.

Communications, Letters, etc., have been received from Dr. De Vrij, Dr. Thresh, Messrs. Maddison, Cross, Langbeck, Inquirer, Haustus.

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PRELIMINARY DIVISION.

Special Classes to prepare Candidates for the Preliminary Examination of the Pharmaceutical Society are held daily, from 10 to 12 a.m., on the following subjects:

Latin Grammar and Parsing. Translation of Latin into English, and vice versa. English Grammar and Essay Writing. Arithmetic and the Metric System of Weights and Measures.

The next Course will commence on October 14th.

BOARD AND APARTMENTS FOR STUDENTS.

In order to save gentlemen the trouble and uncertainty of obtaining comfortable lodgings, Mr. Wills (Principal) has undertaken to provide apartments for a limited number in the immediate neighbourhood, where every comfort and cleanliness is insured. All such students meet at Mr. Wills' private residence for meals.

Terms on Application.

For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON.

St. Thomas's Hospital Medical School,

ALBERT EMBANKMENT, LONDON, S.E.

The WINTER SESSION of 1884-5 will commence on OCTOBER 1st, when an Introductory Address will be delivered by Sir J. Risdon Bennett, M.D., F.R.S., at 3 p.m.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

University College, Liverpool.

THE College provides a complete curriculum for University of London Examinations. There are Physical, Chemical, and Biological Laboratories, where Students will be assisted in Practical Work by Demonstrators, under superintendence of the Professor of the Department. All Classes (except the Medical) are open to male and female students on the same terms. All persons of Sixteen years and upwards will, if furnished with satisfactory testimonials, be admitted as Students. No one is admitted as a Student under Fifteen, and applicants in their Sixteenth year are required to pass a Preliminary Examination.

CHEMISTRY.

PROFESSOR CAMPBELL BROWN, D.Sc.

Autumn and Lent Terms.

General Lecture Courses, each consisting of about Sixty Lectures.

A.—Chemistry of the Non-Metallic Elements and Chemical Philosophy.

B.—Chemistry of the Metals and their Principal Compounds.

Practical Classes throughout the year. Laboratories open daily from 10 a.m. to 4.30 p.m.

The Prospectus, containing full particulars, may be had *free* on application to ADAM HOLDEN, 48, CHURCH STREET, LIVERPOOL.

ENGAGEMENTS WANTED.

FOR Germany.—A competent English and French ASSISTANT desires to enter into a good German pharmacy in a town frequented by both English and French. A chemist's son. Age 22. Height 5ft. 9in. Good address. S. J. W. H., care of J. Higgins, Chemist, Pewsey, Wiltshire, England.

LOCUM TENENS or MANAGER, by a Pharmaceutical Chemist, with first-class experience and highest references. BETA, care of Mr. Burke, William St., Windsor

AS MANAGER, or position of trust in a good house. Thoroughly competent. Age 30. Qualified. Single. Town and country experience. Permanency preferred. ASSOCIATE, 15, St. Swithin's Lane, E.C.

A YOUNG gentleman, aged 18 years (son of a Surgeon), with 12 months' experience in Retail, wishes for a position in a Wholesale house, where he could in time become Traveller. W., 3, Hayter Rd., Brixton, S.W.

AS LOCUM TENENS or Temporary MANAGER. Would not object to good permanency. Age 30. Town and country experience. ASSOCIATE, 33, Reedworth St., Kennington Park, London.

AS JUNIOR. Out-doors. 5 years' experience in Dispensing business. Age 23. Height 5ft. 11in. Salary £60. F. W., 3, Marine Ter., Walton-on-the-Naze.

AS JUNIOR. Large town in Yorkshire preferred, where 2 or more are kept. 3 years' experience. V. E. NEWBOULD, High St., Boro' Bridge, Yorkshire.

DISENGAGED.—As ASSISTANT or MANAGER, during absence of Principal. A competent Assistant with thorough knowledge of French and English pharmacy. Age 40. Good Prescriber, active and obliging, best references. STATIM, 152, Mare St., Hackney, E.

AS DISPENSER to a Surgeon or Chemist, 5 years' good reference from last situation. Other good references if required. GEORGE BRETT, 40, Gospelgate, Louth, Lincolnshire.

SURGEON'S ASSISTANT. Good Book-keeper, Dispenser, accustomed to Chemist's Retail. Would assist Surgeon or Chemist for ten days from 1st October. C., 39, Leighton Grove, Kentish Town, N.W.

AS ASSISTANT, aged 23. 9 years' experience. London house preferred. Disengaged. 906, care of Mr. A. Harold, Chemist, Guernsey.

IN London preferred. Salary not so much an object as good permanency. Fully qualified. West-end experience. Age 34. N., Mr. J. Robins, Woodford, Essex.

DISENGAGED.—As ASSISTANT or DISPENSER, where 2 or more are kept. London house preferred. Age 24. Minor and Hall. CHEMIST, 1, Market St., Harwich.

ENGAGEMENTS WANTED.

AS Junior Assistant. Six years apprentice. Assistant in good country house, also half year in a London suburb. Age 22. W. E., 23, Wrawby St., Brigg.

A DISPENSER from a leading London Hospital seeks re-engagement at a Public Institution, or part time with Surgeon or Chemist. X., Mossley House, Drayton Green Rd., Ealing, London.

LOCUM Tenens. Qualified. By the day, week or month. Town or country. Chemicus, 51, Judd St., St. Pancras, W.C.

AS Assistant or Junior. Near Leeds preferred. Age 20. 4¼ years' experience. Height 5ft. 10in. Churchman. Abstainer. Passed Prelim. Address, J. K., 80, Crawford St., Leeds.

AS Junior, in a good class business. Age 21. Height 5ft. 9in. 4½ years' experience. Statim, 1, Devonshire Ter., Notting Hill Gate, W.

AS Assistant. City experience. Fully qualified. Age 24. Address, Chemicus, 19, Pepper St., Chester.

AS general permanent Assistant, Manager of Branch, or Locum Tenens. Used to Mixed country trade. Total abstainer. Good references. Moderate salary. Rhei, R. B. Sandiland, Pharmaceutical Chemist, Droitwich.

AS Junior. Age 20. 4 years' experience. Height 5ft. 5in. I. E. P., 27, North Hill, Clovelly, N. Devon.

AS Temporary Manager or Assistant, many years experience in London and country. First-class references. Disengaged after October 1st. Chemist, Milton Villa, Shaftesbury Rd. East, Hammersmith, W.

OUT-DOOR. Total abstainer. Good Prescriber, Tooth Extractor, and Dispenser. Country preferred. Moderate salary to commence. Medicus, Gloucester St., Malmesbury, Wilts.

FOR a few hours daily, or two afternoons per week. 16 years' varied experience. First-class references. Now disengaged. F. R., 43, Trinity Sq., Southwark, S.E.

AS Assistant or Dispenser in a good business, Major qualification. 7 years' experience. Age 23. H. C., 38, St. Paul's Rd., Bradford, Yorks.

OUT-Door or as Manager. London and country experience. Qualified. Well up in Dispensing, Prescribing and Dentistry. Single. Age 37. Permanency preferred. Associate, 8, Bath Grove, Hackney Rd., E.

AS Junior, in London, with time for study. Age 21. C. B., 82, King's Rd., S.W.

AS Turnover or Junior Assistant. 2½ years experience. Age 27. Single. Height 5ft. 4½in. Good reference. Small salary. Drake, 4, Ludgate Circus Bldgs., London.

AS Assistant in London, 3 or 4 days per week. Accustomed to Pharmaceutical and Hospital Dispensing. Highest references. R. A., T. May, 25, Warner St., New Kent Rd., S.E.

AS Improver in a good class Dispensing business. Age 21. Height 5ft. 11in. 3 years' experience, with time for study. J. Wicks, Monkton Combe, near Bath.

AS Manager, where there are other Assistants. Has held that position in a West-end firm. Highest references. Speaks French. A. B., 15, Hereford Rd., Bayswater, W.

LOCUM Tenens.—Thoroughly reliable and efficient. Highest references. Qualified. Quick and accurate Dispenser and Prescriber. Dentistry. Wide varied experience. The Apothecary, Medical Department, G. P. O., London.

ENGAGEMENTS WANTED.

AS Temporary Assistant or Manager, by day or otherwise. Thorough experience. Age 30. Present terms 6s. per day. Abstainer. Disengaged. Chemicus, 2, Myrtle Cottages, Hoe St., Walthamstow, E.

GOOD Junior Assistant. Age 22. 6 years' experience. Good references. Apply, A. Stammers, Long Melford, Suffolk.

AS Manager or Senior Assistant. Good experience. Steady. Apply, stating salary, which must be liberal to H. W. Breton, 14, Eardley Cres., South Kensington, S.W.

SURGEONS or Public Institutions. As Dispenser. Minor and Apothecaries' Hall. Ætat. 27. 11 years' experience. Can Extract Teeth and Prescribe. Good references. Minor, 12, Angel Row, Market Pl., Nottingham

LOCUM Tenens. Day, week or month. Town and country experience. Minor qualification. Good references and moderate terms. A. P. S., 34, Bridge St., Cambridge.

AS Locum Tenens. Age 36. Minor qualification. Over 20 years' experience in London and country. A. P. S., 55, Avenue Rd., Leamington.

AS Junior, with time for study. Seaside or London preferred. Disengaged. Age 23 years. Height 5ft. 11in. 8 years' experience. Good references. Moore, 122, High St., Cheltenham.

AS Junior or Improver. Age 21. G. Hunn, 27, High St., Chelmsford, Essex.

AS Manager of Branch, or Senior in a good business. Qualified. Midland Counties preferred. Address, A. P. S., 8, Highbury Pl., Cotham, Bristol.

AS Assistant. Age 24. Height 5ft. 10in. Accustomed to good class of business. Chemicus, 9, Trafalgar Sq., Scarborough.

AS Assistant. Country. Accustomed to a good class country trade. 6 years' experience. Age 22. B., 31, Praed St., Paddington, W.

AS Assistant, either in Wholesale, or good class Retail. Age 23. Height 5ft. 9in. T. A. H., 15, Commercial Rd., Bournemouth.

AS Turnover, Apprentice or Improver. Age 18. 12 months' London experience. North preferred. Passed Prelim. J. A. Hughes, Cross St., Holywell, N. Wales.

APPRENTICESHIP to a Chemist and Druggist. 3 years, in-doors, by a youth, 17, who has passed his Preliminary examination. Address, W. J. R., 76, East St., Sittingbourne.

ASSISTANTS WANTED.

APPRENTICE.—The guardians of a youth, who has passed the Preliminary examination, are desirous of placing him for 4 years as in-door Apprentice to a Pharmaceutical Chemist, with high class Retail and Dispensing business. Moderate premium. Address in first instance, H. Monkhouse, Chemist, Derby.

APPRENTICE.—A Pharmaceutical Chemist requires a gentlemanly and well educated youth as Apprentice, now or in a month hence. Comfortable home and every facility offered. Moderate premium. Apply, by letter, to A. B., Messrs. Thos. Hodgkinson, Prestons & King, 81, Bishopsgate St. Without.

APPRENTICE.—A Pharmaceutical Chemist has a vacancy for a gentlemanly, well educated youth in a light Retail and Dispensing business. Comfortable home and every opportunity for gaining a thorough knowledge of the business. Moderate premium. Apply, S. Newbury, 52, Holdenhurst Rd., Bournemouth.

ASSISTANTS WANTED.

APPRENTICE.—Messrs. HILL & Co., Limited, Chemists, Lynn, have a vacancy for a well educated youth, who can thoroughly learn every branch of the business. Must write a good hand.

R. JEFFREY & SON, Cheltenham, have an immediate vacancy for an ASSISTANT, aged about 22. One only kept. Abstainer preferred. Please state usual particulars and salary required.

A JUNIOR ASSISTANT, in-door, for a Dispensing and light Retail business. Apply, stating age, height, salary required, and enclosing photo. (which will be returned), to HENRY J. STEPHENS, Chemist, Loughborough Parade, Loughborough Junction, S.W.

A CHEMIST in London has a vacancy for a Dispensing ASSISTANT, desirous of studying at the Laboratory, Bloomsbury Square. Time allowed, from 9.30 till 1, 4 days a week. Address, with full particulars, to L. C., Messrs. Flood & Co., Wholesale Druggists, 102, Blackman St., London, S.E.

IMMEDIATELY.—In a good Dispensing business, near London, an ASSISTANT, not under 24 years of age. Salary £40. Address, stating age and reference from last employer, J. P. MELLIN, 36, High St., Wimbledon.

AT once.—A competent ASSISTANT, with Minor qualification, chiefly to Dispense and assist with the books. One who has had experience in a good class Pharmacy, and able to take charge occasionally. State full particulars, with carte, giving age, height, salary and references, to G. BROWN, Pharmacist, Sandown, I.W.

BY October 1st.—An ASSISTANT, for a light Retail, Dispensing, and Prescribing business. A knowledge of Dentistry would be an advantage. Address, J. H. BALDOCK, 3, High St., South Norwood, London, S.E., stating full particulars, with age, and salary required.

PARIS.—A Dispensing ASSISTANT, speaking French. Must possess good references as to ability and character. Exceptional situation for suitable young man. Apply, 1, Southwick St., W., where all particulars can be obtained.

A GOOD JUNIOR, for a brisk Retail and Prescribing business. Age about 20. One only kept. Two hours daily allowed for study. Within easy distance of either Muter's or Wills'. Apply, stating salary and full particulars to F. W. SANDY, 390, Walworth Rd., S.E.

A GENTLEMAN, well educated, possessing the Major qualification of the Pharmaceutical Society, having a good knowledge of business, and from 25 to 30 years of age, for a well remunerated, gentlemanly, permanent post, with excellent future prospects. Those not possessing all the above qualifications are requested not to apply. Apply, by letter in the first instance, to M. CARTEIGHE, Esq., 180, New Bond St., London.

EARLY in October, for 3 months. An ASSISTANT, about 21, for a branch business. Plenty of time for study. Must have good references. Apply, with full particulars as to salary, &c., to GEO. BENTLEY, Chemist, Knighton, Radnorshire.

C. GARRAD, Chymist, Leamington, has a vacancy for a Junior ASSISTANT. In applying, please be as explicit as possible, stating amount of experience and where gained, and enclose carte, which will be returned with answer.

JUNIOR, first week in October, for select Retail and Dispensing business. One who can Dispense. Must be active, energetic, of good appearance and address. Apply, with carte, stating age, height, salary and references, to Mr. BROWNE, Chemist, Eastbourne, Sussex.

AN ASSISTANT, about 24. Minor qualification preferred. Accustomed to a good Dispensing business. Apply, personally if possible, to A. BAINBRIDGE, 69, Churchfield Rd., Acton, W.

ASSISTANTS WANTED.

JUNIOR or good IMPROVER. Full particulars, with carte, to E. BING & SON, Pharm. Chemists, Canterbury.

AN APPRENTICE.—A well educated youth, in an old established good class Family and Dispensing business, affording every facility for gaining a thorough knowledge of the business. Premium moderate. A Porter kept for warehouse and rough work. Apply to Mr. S. Goss, Pharmaceutical Chemist, Opposite the Hotel, Barnstaple.

A GOOD CLERK, having experience of a Chemist's business, and if possible having the Minor qualification of the Pharmaceutical Society. Apply to M. S., 126, Buckingham Palace Rd., S.W.

ASSISTANT. Out-door. Apply, stating age, height, salary required, references (enclosing carte de visite), to be returned, J. CROSBY ROBSON, Pharmacist, Middlesbro'.

IMMEDIATELY.—An ASSISTANT, to the Dispensing department. Must be conversant with the Welsh language, and accustomed to a Mixed country trade. Apply, stating particulars, to J. HARRISON JONES, Chemist, Denbigh.

TO LOCUM TENENS. Would the gentleman who was in charge of the business of James Stevenson, for ten days in August, 1882, communicate with J. G. PREBBLE, 9, Tulse Hill, S.W.

JUNIOR, of good address for a Dispensing and Family business of the best class. Must write a good hand. Apply, stating age, height, salary required, and previous experience, to EDWARD PEARSON, Chemist, Nottingham. Photograph to be enclosed if possible.

IMMEDIATELY.—A JUNIOR or IMPROVER to assist in a light Retail and Dispensing business, for one month or less. Apply, stating terms, &c., to BATCHELOR & SON, Chemists, Fareham. Also a vacancy for an APPRENTICE.

A JUNIOR ASSISTANT, accustomed to Mixed country business. Apply, stating references, salary required. W. H. JONES, Chemist, Mountain Ash, South Wales.

A MANAGER, for a branch business, to take sole responsibility and charge. House and garden if desired, and no objection to married man. Would entertain giving an interest in the business with view to purchase to a good man able to send satisfactory references, and if necessary, securities. Apply to GWILYM EVANS, Llanelly, S. Wales.

IMMEDIATELY.—A good Dispensing ASSISTANT, accustomed to first-class business. Four kept. State age, height, salary, and last situation. All letters not answered by return may be considered as declined. GIBBS & GURNELL, Ryde, Isle of Wight.

SPILSBURY (late Cutting & Son), Leamington, has a vacancy for a qualified DISPENSER. In-door. Apply, stating necessary particulars, including references and salary required.

AN experienced ASSISTANT, accustomed to Dispensing and light Retail. Hours 8 to 8.30. Sunday duty light. Salary £50, in-door. Apply, R. H., 17, Broad Gate, Coventry.

AN in-door ASSISTANT, for a suburban business, near Crystal Palace. Must be able to Prescribe and Extract Teeth. Two evenings a week for study and recreation. By letter first, to BETA, 14, Miles Lane, E.C.

AT once.—A JUNIOR, about 20 years of age, in a Dispensing and Retail business. Must have passed Preliminary. Permanency. Comfortable home and fair salary given. First-class references required. Apply, personally if possible, to W. M. COVELL, Chemist, 302, Mare St., Hackney, London, E.

ASSISTANTS WANTED.

COMPETENT Assistant, about 24 years of age. Apply to R. Morgan & Co., Pharmaceutical Chemists, 5, Liverpool St., City.

IMMEDIATELY.—Junior Assistant, of good address, not under 22 years. Well up in Dispensing and Counter Work. Exceptional references required. Apply, personally or by letter, stating age, height, and salary required, to Mr. W. B. Trick, 92, Green Lanes, London, N.

A COMPETENT Assistant, qualified, accustomed to good class business. Salary £50 the first year. One Assistant only kept. J. Horncastle, Pharmaceutical Chemist, 17, Craven Rd., Westbourne Ter., W.

ASSISTANT about 25 (one only kept). Must be a good salesman, willing to make himself generally useful, and take alternate Sunday duty. A. Binge, Chemist, 44, Seven Sisters Rd., Holloway.

MESSRS. ARGLES & STONHAM, Maidstone, have a vacancy for a Junior Assistant (must have passed preliminary examination). Work principally in the wholesale. Apply by letter, stating age, qualification and salary required.

AN Assistant, accustomed to good class trade. Progressive salary to suitable man. Age from 23 to 27. Carte required. Hughes & Wyatt, Stourbridge.

A FIRST and Second Assistant. Wanted in a good class Retail and Dispensing business. Salaries according to competency. References as to qualification and character must be good. Apply, with all particulars and carte, to G. Speechly, Bishop Stortford.

GOOD Junior required immediately, where another is kept. Must be competent to dispense, and well up in retail. Good references indispensable, and preference given to one desiring a permanency. Apply personally, or if by letter enclosing carte and full particulars, to Llewellyn V. Rees. 267, King's Road, Chelsea, S.W.

MORRIS, BANKS & CO., High Street, Birmingham, are in immediate want of Gentlemanly Assistant (qualified), indoor, one seeking a permanancy preferred. Applicants will please state full particulars, with references, and say salary required. Business is competitive. Carte will be returned.

JUNIOR or Improver for good country business. Hours 8 to 8. No Sunday duties. Comfortable home. Time for study if required. Or an Assistant (age about 23), to manage business for 3 or 4 weeks. Apply, stating age, salary required, references, &c., to W. Wilkerson, Chemist, Rushden, Higham-Ferrers.

IMMEDIATELY.—An Assistant, out-door, who is a neat and accurate dispenser and accustomed to good class retail. Send carte and full particulars to Mr. Higgins, Chymist, Farnham, Surrey.

JUNIOR Assistant, who understands Post Office duties. Apply to Chemicus, 50, Queen's Rd., Brighton.

JUNIOR Assistant. Out-door. Speaking French and well acquainted with French pharmacy. Good salary, and reasonable hours. Send all particulars to Schouver, Chemist, Princes St., Hanover Sq., London.

AN experienced and strictly trustworthy Assistant, who is seeking a permanent and comfortable engagement. Should be well acquainted with light Retail, Dispensing and Prescribing, and able to Extract Teeth. Full particulars, with carte, to B., care of Messrs. Barron, Harveys & Co, Giltspur St.

A. E. HORRELL, Chemist, Dartford, is in want of a good Assistant, either in or out-doors. Good salary and very easy hours. Apply personally, if possible.

BUSINESSES FOR DISPOSAL.

WHOLESALE Drug Trade.—A firm of Wholesale Druggists in New Zealand, doing a good business, require a Partner with about £7500. For particulars apply by letter, in the first instance, to Fletcher, Fletcher & Stevenson, North London Chemical Works, Holloway.

PHARMACY, with good Residence, to Let. Arranged specially for best class Business. Occupying commanding position in Broad St., close to Edgbaston, the wealthy suburb of Birmingham. This is an excellent opportunity for an accomplished Chemist to carry on a superior and lucrative business, which has been successful for 30 years. Good class Dentistry could be added with advantage. No fixtures and no goodwill to be paid for. Apply, Mr. Edwards, 16, Bennett's Hill, Birmingham.

IMMEDIATELY.—In consequence of domestic trouble. The stock, fixtures, household furniture replete, goodwill, &c. Corner shop. Beautifully situated. Side entrance. Drug room, small garden, poultry yard, greenhouse, &c. Lease 9 years. Rent £30; let off £13. Semi-detached. Established 12 years. Great bargain. Apply to Gilbert & Son, Grocers, Ainsworth St., Cambridge.

LEICESTER (suburb).—A genuine Dispensing and Prescribing Business, with Aërated Water Machinery and Syphons attached, for £600 (without Machinery, &c., £500). Aërated Waters nearly pay rent. Splendid opening for Dentistry. Good house and storeroom. Rent £55; on lease. Satisfactory reasons for disposal. Address, W. Rowe, Chemist, Leicester.

GLOUCESTERSHIRE.—First-class Retail and Dispensing, in fashionable town. Shop is handsomely fitted, has large commanding double plate front, and is capable, with a man accustomed to first-class trade, of doing a large return. Ill-health of present owner is sole cause of sale. Returns £800. Price £700; or, if preferred, valuation of stock and fixtures. F. J. Brett, Valuer, Leicester.

CHEMISTS or others wishing to increase their incomes by adding a high class, profitable and exclusive Manufacturing Business, requiring very small space, can address (prepaid), Mr. Bennett, care of Mr. Ives, 321, Goldhawk Rd., London, W. Total cost to purchase and work about £80.

HANTS.—A thoroughly genuine Retail and Prescribing Business, with Dentistry attached. Main thoroughfare. Within 15 minutes of the sea. Returns over £800. Very profitable. No booking. Sole reason for disposing, proprietor retiring. Comfortable house. Back entrance, stable, stores, &c. Premises owned by proprietor, and would let on lease or otherwise. Price £700. Chemicus, Hearon & Co., 5, Coleman St., London.

BIRMINGHAM.—Suburban. Dispensing, light Retail and Prescribing. Returning over £800 per annum. The business is old established and many years in vendor's hands, whose only reason for sale is continued ill-health. Lease. Price £500. F. J. Brett, Valuer, Leicester.

MESSRS. HINE GILBERT have for transfer:—Midlands. Returning £1500. Price £1000; value of stock. Another. Returns £3000. Cash £1500. Middlesex. Returns £800. Rent £30. Only £320. Home County. Returns £700. Full prices. Good house. Price £700. Suburban. Returns £600. Modern house. Price £500. Many others. Apply, 17, Hart St., Bloomsbury.

OLD established Chemist's Retail and Prescribing Business, situated near Oxford Circus. Has been much neglected, but capable of great increase. Returning about £200 a year. Must be sold, as the landlord does not understand business. This is a first-rate opportunity for a young pushing Chemist. Address, Dr. H., 28, Westbourne Park Ter., W.

BUSINESSES FOR DISPOSAL.

LONDON (Suburb, S.W.).—A good class light Retail and Dispensing BUSINESS, in a very improving neighbourhood. Business capable of great extension. Shop handsomely fitted and well stocked. Satisfactory reasons for disposal. Price £550. Apply, by letter, to W. G., 5, Redcross St., Southwark St., S.E.

YORKSHIRE.—A profitable Mixed Branch BUSINESS, in a thickly populated district. No opposition. Returning between £5 and £6 per week. Can easily be doubled. Rent low. Will be sold to an immediate purchaser for £120, including goodwill, stock and fixtures. Satisfactory reasons for disposal. J. W. H., Woolley, Sons & Co., Manchester.

A BARGAIN.—London, W. Handsomely fitted corner SHOP. Well stocked. Doing £7 weekly. Purely cash, and very profitable. Ill-health cause of disposal. QUAMPRIMUM, care of Messrs. Newbery & Sons, 1, King Edward St., Newgate St., E.C.

YORKSHIRE.—A ready money Prescribing and general RETAIL. Main thoroughfare in a large manufacturing town. Returns over £500 a year. Good house, and warehouse attached. Rent £35. Vendor having bought a much larger business abroad, reasonable offer entertained. Address, RHEI, care of Messrs. Hirst, Brooke & Hirst, Leeds.

SOUTH Coast.—In a large and fashionable watering place. Retail, Dispensing and Prescribing BUSINESS, in a busy thoroughfare. Old established. Very profitable. Returns about £700. Good Proprietary Articles. Low rent. Satisfactory reasons for sale. May be thoroughly investigated. Apply, by letter, A. B., 14, Romilly Rd., Finsbury Park, N.

EXCEPTIONAL opportunity to an energetic man, with limited capital. Cash BUSINESS. Full prices. Population 2000. No other chemist. New Dock now completed (cost £250,000), close to premises. Sole reason for disposal, owner's entire inability to give any supervision whatever to it. Apply, Mr. PROCTER, Chemist, Penarth, Glamorganshire.

£1800 returns average for 3 years.—An exceptionally profitable light RETAIL, with a large number of well known Proprietary Articles, the sale of which can be indefinitely increased. The shop is handsomely fitted, and in prominent position of large country town, commanding an extensive district. Net profit from £700 to £800 per annum. The whole is for sale at a valuation of goodwill, stock and fixtures, which are estimated to be about 1 year's returns. F. J. BRETT, Valuer, Leicester.

MESSRS. GURDEN BERDOE have for transfer:—DURHAM. Strictly reliable Retail, Dispensing and Prescribing business, showing £380 net profit. Good house and garden. Taken larger trade south. Price £630. CHESHIRE. Good class Retail and Dispensing trade, showing £425 net profit. For £900. NOTTS. Old established Retail and Prescribing trade. Returns £1500. Net profit £500. For about £830. NORFOLK. First-class Retail and Dispensing, which has shown £1400 net profit. Nowneglected. For £850. Rare opportunity. LONDON, N. Well-fitted corner Retail and Dispensing. Showing £300 net profit. For £700. S.W. Corner Retail and Prescribing and Dispensing. Showing £650 net profit. For £1100. Trial allowed. N.E. Only wants seeing. Well-fitted Retail. Returns £7 weekly. Net profit £150. For £225. Apply, 30, Jewry St., Aldgate, City.

SOUTH West of England.—First-class Retail and Dispensing BUSINESS. Returning £1350, at full prices. Handsomely fitted shop, heavily stocked. Convenient house. Net profit after paying all expenses, £500. Price £1350. Every investigation allowed to bonâ fide purchasers. Apply by letter, in first instance, to VERITAS, 59, Oakfield Rd., Finsbury Park, N.

HENRY GADD,

Member of the Pharmaceutical Society,

CHEMISTS' TRANSFER AGENT,

97, FORE STREET, EXETER.

H. G. will be happy to furnish intending purchasers with particulars of Businesses from his Register. He has several to offer in Town and Country, to suit large or small capitalists.

Applications for either the sale or purchase of Businesses inserted in Register free of charge.

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WALL Case, as fig. A 88, in splendid condition, 8ft. long, price £28, a bargain; 12ft. Wall Case; complete set of Oak Fittings; a silvered glass Show Stand, cheap; large and small Pear Shape Carboys and Stands; large assortment of Dispensing Screens; blue and white Ointment Jars and Pots; variety of Specie Jars and Stands; 24 3, 4 and 5 grain Pill Machines; Sponge Cases, A 41 and A 42; 12ft. Fixture as Maw's fig. A 84; 2ft., 4ft., 6ft., 8ft., 10ft. 12ft. lengths mahogany fronted Drawers, glass knobs and glass labels (bevelled edges), with lockers under for bottles, &c., 4ft. high; Balance Scales and Weights. E. NATALI, 207, Old Street, near Pitfield Street, London, E.C.

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"New York Medical Journal," *August* 1880,
Dr. F. Weir,
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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 745.] SATURDAY, OCTOBER 4, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
Introductory Sessional Address. By W. T. Thiselton Dyer	261
International Forestry Exhibition at Edinburgh (*concluded*)	266
Influence of Light on the Disengagement of Oxygen by Plants. By J. Reinke	268
Acetate of Magnesium. By A. F. W. Neynaber	268
EDITORIAL ARTICLES AND NOTES:—	
The New Session	269
Notes:—Nicolas Leblanc and his Statue—Poisoning by Cheese—Patent Medicines and Infanticide—A Mountain of Alum	270
TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY:—	
Meeting of the Council:—	
Election of Associates and Apprentices	271
Benevolent Fund—Election of Annuitants	272
The New Premises in Edinburgh	273
Evening Meeting:—	
Reports of the Professors and Distribution of Prizes	274
PROVINCIAL TRANSACTIONS:—	
Hawick Pharmaceutical and Chemical Association	279
PARLIAMENTARY AND LAW PROCEEDINGS:—	
Alleged Presence of Lead in Lemonade and Ginger Beer	279
OBITUARY	280
CORRESPONDENCE:—	
The Composition of Seidlitz Powders	280
Pharmacy in New Zealand	280
Pil. Phosphori, B.P.	280
Answers to Correspondents	280

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 5th, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at half-past 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 29th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held.

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The Society's Rooms at 119A, George Street, Edinburgh, are closed. All communications should be sent to the new premises, 36, York Place, Edinburgh, which will be opened on Tuesday, October 14th.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 5th day of December next, at 12 o'clock precisely.

By order of the Council,

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 1st, 1884.

There are at present *thirty-nine* annuitants, receiving £1320 per annum, and casual relief is also granted, amounting to nearly £700 per annum, involving a total annual expenditure of upwards of £2000.

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OF THE

Pharmaceutical Society of Great Britain.

FORTY-THIRD SESSION, 1884—85.

This Session commenced on Wednesday, October 1st, 1884, as follows:—

CHEMISTRY AND PHARMACY..... Professor REDWOOD and Mr. DUNSTAN.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
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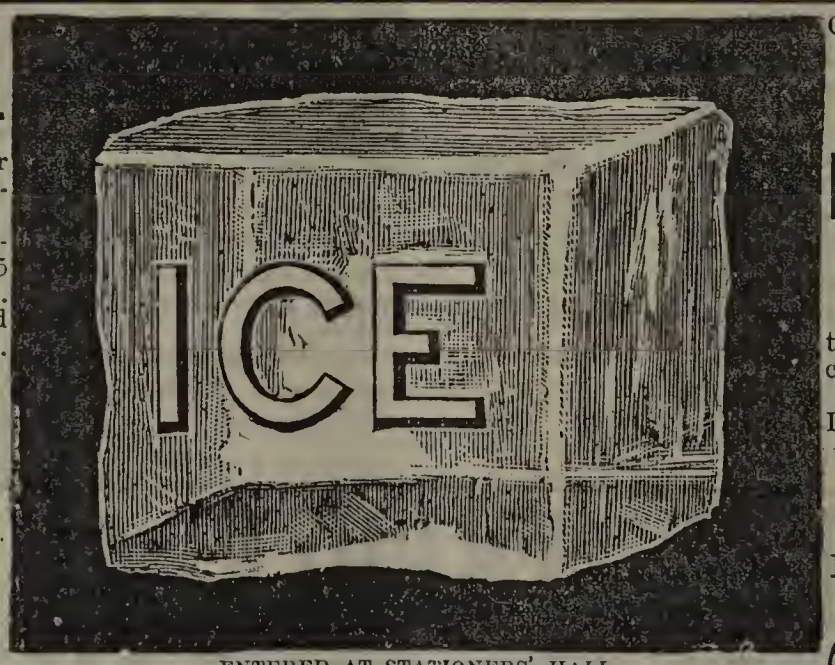

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FERRIS & CO. *v.* GOODMAN.

Notice is hereby given, that by an Order of the Chancery Division of the High Court of Justice, made the 18th day of July, 1884, in the above action, it was ordered that the Defendant and others be **perpetually restrained** from selling, or offering for sale, any formula or recipe for "**Nepenthe,**" and from otherwise prejudicing the sale thereof by, or injuring the title thereto, or Trade Mark therein, of the Plaintiffs, Messrs. FERRIS & Co., of Bristol, Wholesale Druggists, the **Registered Proprietors thereof.**

And it was further ordered that the Defendant do pay the costs of the said action.

Dated this 12th day of August, 1884.

(Signed) CHILTON & GREEN-ARMYTAGE, Bristol,
Solicitors for the said Plaintiffs.

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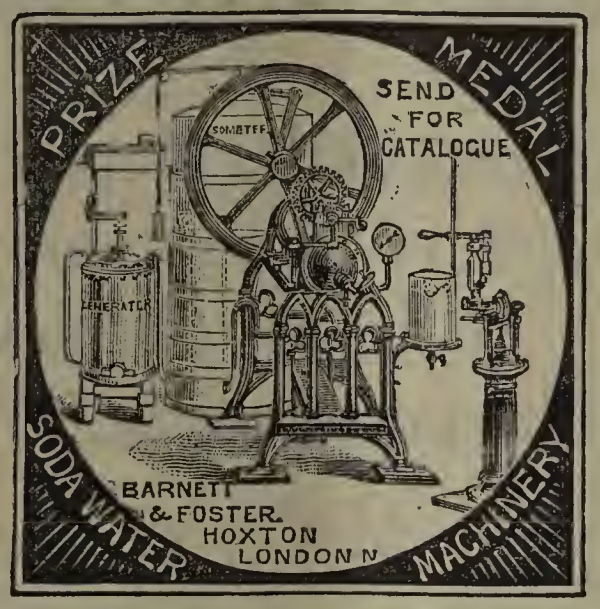

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DELIVERED AT THE COMMENCEMENT OF THE FORTY-THIRD SESSION OF THE SCHOOL OF PHARMACY,

October 1, 1884.

By W. T. THISELTON DYER, C.M.G., M.A., F.R.S., F.L.S.,

Assistant Director of the Royal Gardens, Kew.

Mr. President, I must confess to you that when I was asked to address a few words to the students and members of this Society to-night I felt an uneasy mixture of pleasure and dismay. I was pleased because, as far as I understand the work which this Society undertakes to do, and as far as I have observed the way in which it performs what it undertakes, it has always seemed to me a body entitled to very great respect and admiration.

"Alas, how easily things go wrong!"

is the burden of a poem of George Macdonald's which treats of the most human of all relations. There is a good deal of life, however, in which the words are equally apt to ring in one's ears. But the remarkable thing about this Society is that, as far as one can judge from an external point of view, it always goes right. I am not referring to the conduct of its internal affairs, of which I am afraid I am wholly ignorant. I do not doubt that they leave little scope for criticism. What I particularly have in view and what I am very glad to be able to speak about is the enlightened encouragement which this Society, I believe ever since it has had a corporate existence, has extended to all knowledge which bears on its pursuits. It was for this reason that I confess I felt it no small distinction when I was requested to speak here this evening.

But, as I have said, this feeling was not unmixed with another. It is a little dangerous to plunge into the midst of an elaborately organized institution such as this, whose affairs and business one has only hitherto viewed from the outside. I feel, therefore, some dismay at being called upon to talk at large under such circumstances. I can only say that if I have the misfortune to tread on ground I had better have avoided, I am sure you will cover my indiscretion with indulgence.

A considerable feature in the business of to-night has been the distribution of prizes, tangible rewards on which I am not so remote from my own student days as not to be able to warmly congratulate the recipients. The admirable words spoken in this room by Professor Michael Foster last year must be still lingering in the memory of those who were present on that occasion. I so thoroughly agree with the wise counsel which he gave, both in regard to the necessity of a proper training for the future chemist and druggist and otherwise, to those to whom examinations are for a year or two to come barriers in the path to be seriously reckoned with, that I shall certainly not attempt to improve upon it. But, remembering as I do, over how large a space in my own life, as it seems to me now, the presence of the examiner brooded like a spectre, I cannot shake myself wholly free from some reflection on the subject.

I am quite prepared to frankly confess that my own experience of the examination room, if it brought some satisfaction, also brought some disappointment. I can see clearly enough now why it was so, and perhaps you may be glad to have the benefit of the reason. I made the mistake, which I daresay many of you will make, of paying too much attention to some things and neglecting others. The latter invariably turned up in the examination room, and the former never seemed to excite the same interest in the examiner that they did in me.

In checking this tendency to wander about the fields of knowledge, which ought rather to be systematically tilled, I am disposed to think that the ordeal of an examination is not to be despised. The grammar of a science must for practical purposes be as thoroughly and laboriously learnt as the grammar of a language. Study, then, the subjects that are put before you with equal assiduity in all their parts. Do not—for the moment, at any rate—let your attention run away too far on particular points and shirk others because they are dry. You might as well in learning a language scorn a particular part of speech or words beginning with a particular letter of the alphabet. If, however, you treat your subjects fairly as a necessary discipline, and have a proper training, the examination room should have no terrors for you.

Of course I need not say that I do not mean to give the slightest encouragement to what is called "cramming." That is a practice that no one who has indulged in it can look back upon without some loss of self-respect. But for my own part I am always inclined to think that cramming is in more cases to be attributed to some defect in the scheme of education than to inherent vice in the student. If I may be pardoned again a personal reminiscence, I have a keen recollection of a time when I was reading under great pressure the higher branches of mathematics. At the moment of greatest importance to me I had to break off to commit to memory, amongst other things, the Thirty-nine Articles and the minute details of Old Testament history. Now I do not for a moment contend that such things should not have their place in a wide liberal education. But they were demanded of me when they seemed singularly irksome and incongruous, and I do not hesitate to say that I despatched them with every artifice of cramming in my power.

But in the future there will, in the natural course of events, be less and less room for this horrid parody of study. The degree to which practical instruction has developed of late is little short of amazing. It is not so long ago that a distinguished mathematician expressed the opinion that personal demonstration was superfluous to the student in the

face of the testimony of men of unblemished moral character. But progress has, nevertheless, not ceased. As Lord Rayleigh well said in his recent address to the British Association, "The multiplication of laboratories gives to the younger generation opportunities such as have never existed before, and which excite the envy of those who have had to learn in middle life much that now forms part of an undergraduate course." In my own experience as an examiner nothing has provoked me more than meeting with innumerable cases where failure was not due to want of assiduity or intelligence, but simply to recourse not having been had to the improved methods of teaching which the modern practical examinations absolutely demand. No amount of mere reading will teach a student to display a structure, make a dissection, or analyse a simple chemical with which he is wholly unfamiliar. I do not think, however, that now-a-days very much more pressure is put on the student; his difficulties are indeed almost too elaborately smoothed out of his path. But the pressure which is being removed from the scholar is most emphatically put on the teacher. The amount of knowledge which is now required in every branch of study looks no doubt large and even formidable to the previous generation. And it would be what it looks if the means and appliances of instruction had not been so enormously improved.

The net result is that the professional student goes into the world better equipped than he ever was before. This is the general experience everywhere, and I do not for a moment suppose that this institution is any exception to the rule; nor is the pressure likely to be relaxed, if only because what is going on in other countries will react upon us here. At least I judge this from such a fact as the recent appearance in Germany of Luerssen's great 'Handbook of Systematic Botany,' the most comprehensive work we have at present on the vegetable kingdom as a whole. This was expressly written for the use of students of medicine and pharmacy. I do not think any publisher would find it a very remunerative speculation to reprint its two thousand solid pages in this country, and I am not sure that it is desirable that our mental digestion should ever show this kind of capacity. But it is significant to find issued for the general use of professional students abroad a book which with us would only be considered suitable for an "honours" course.

For my part I have no doubt that we are in the grip of an inexorable and irresistible movement, the direct tendency of which will be that all of us who do not want to be stranded will have to learn a great deal more and learn it better. It will be small comfort perhaps if I say that I think pharmacy seems to me to be particularly in the thick of it. Well, I, being as you know an outsider, do not in the least regret it. Let me try and give some reasons why I think you should not regret it either.

If more is given you more will be undoubtedly expected. I suppose that to those older members of this Society, who can survey the work which it has already accomplished, the change must seem enormous. Some years ago, I found myself with a medical friend in a town in the west of Ireland, where we discovered a common acquaintance ill at the hotel. We set out to procure some simple drug to give him relief. After a long search, we at last discovered, with the aid of the constabulary, the only chemist's shop in the town. I never stood more aghast, at being shown a shed which might, in better days, have been a cowhouse. The pharmacist was away, and we peered over the closed hatch of the open doorway, dimly making out in the gloom a chaotic assortment of jars and ill-looking bottles. I suppose half a century ago such a state of things was not uncommon. Now the familiar diploma in some neat place of business is the assured symbol of courteous and intelligent aid. Well, this is a great advance; but I do not suppose that you will stop here.

As you know, the members of the medical profession are at the present time obliged to learn most of your business in addition to their own. This is a most extraordinary arrangement. I do not doubt that materia medica, pharmacy and practical dispensing are about as irksome to them as divinity was to me, and that they are treated much in the same way. We shall probably live to see them eliminated from medical studies. I am disposed to think that this reform will pave the way for a more reasonable division of the resources of healing, at any rate, where the population in a district is dense enough to support a pharmacist as well as a doctor. This being so, no assiduity on your part can be thrown away in acquiring a perfect mastery of the technicalities of your work. And to a man whose ingenuity has been stimulated by a good fundamental scientific training, the course of every day business must bring a constant amusement in solving the practical problems which are propounded by the other branch of the profession. At least I judge so from the notices which appear monthly in your Journal. From my own experiences I have been perfectly amazed at the dexterity which can be shown, no less than the disastrous failure, in the preparation by different hands of the same formula. When I was reading mathematics, my tutor was always impressing upon me that it was not enough to solve a problem, but that an "elegant solution" was the real thing to aim at. To you the precept will have a more practical meaning.

You will say that this is an extremely utilitarian view to take. And no doubt it is. But no man should dislike aiming at perfection in any branch of human activity to which he devotes himself. The most competent men will come nearest to it, and will find satisfaction accordingly. But all of us may try to give a little "style" to our work and

lift ourselves proportionably out of the dead level of life in doing so. Pharmacists must then be peculiarly men of resource, ready to cope with every reasonable (and sometimes unreasonable) difficulties of their practice. Admitting this, as I suppose everyone does, it is only reasonable that they should have a voice in settling the officially prescribed details of the manufacture of the drugs which they have to use. One would certainly think that the compilation of the Pharmacopœia was especially a matter in which the members of this Society should take an official part. And so I hope it may be. I believe the community would gain greatly by their assistance. Perhaps then something may be done to remedy what has always seemed to me a great stumbling-block, the pervading nastiness of "medicine." It is in vain to argue with your doctor; he will never admit more than that the remedy he prescribes is "not so very bad." I cannot help thinking that pharmacists, bringing practical skill to bear upon the matter, might sensibly alleviate one of the minor troubles of life.

But this is not the whole of my position. The members of this Society go out over the face of the country and will become more and more the local representatives of a great deal more of accurate and useful knowledge than is possessed by the members of the communities in which they live. I do not doubt that this will be gradually found out and made use of. Already in many parts of the country the pharmacists are to be found taking the lead in minor scientific organizations, field-clubs and the like. From the very circumstances of their existence they might do an immense deal in the local promotion of scientific instruction. As a schoolboy in London I remember a small chemist's shop in a not very fashionable street, which had a fatal fascination for me. It drove a pretty brisk business, but it was at the same time half filled with scientific apparatus. I need scarcely say that for many months it absorbed all my pocket money to my great satisfaction and the great annoyance of my relatives. I have always been very grateful to that shop.

Your ambition should, I think, soar a good deal higher, however, even than this. More from accident than temerity I have taken no counsel with anyone as to what I should say to-night. It is, therefore, nothing more than a coincidence that I find myself very much anticipated in what I was about to speak of by an article on the possible developments of pharmacy which appeared in the last number of your Journal. I need not then enlarge upon the text. If you equip yourself with the needful scientific training, I can hardly believe that the public will be slow to put upon you the work you show yourselves fitted to perform.

This is not, however, the only advantage which some of you, at any rate, will reap from the studies which you will pursue in this place. I need not remind you of the well-known names of men who have risen from the ranks of pharmacy to high eminence in the world of science. Some of them of our time are still with us; others we have too prematurely lost. But I am sure there are many to be counted among the members of this Society who have found infinite pleasure beyond their daily work in the studies they commenced here. The man to whom we all look up as the head of Muscology in Great Britain is a chemist and druggist in a country village. Need I say that his name is Mitten and that he resides at Hurstpierpoint? And it comes to my mind that a member of this Society carrying on a large business in a city in Italy,—Mr. Henry Groves, of Florence,—is by general consent the best living authority on the still imperfectly explored flora of that entrancing country. It used to be the case that the prudent people of this world saw only in devotion to pursuits of this kind a likelihood of diversion from the practical business of life. I do not know how this may be; I have never seen its effects. My friend Mr. Groves, I suspect, rather brought business energy and capacity to his recreation than allowed his recreation to hamper his business. Noticing this, I could not resist the impertinence of asking him how he came to be so good a botanist. If I remember rightly he simply said that botany had been part of his professional studies in this building, and insensibly all the rest had followed.

And so I suppose, from time to time, it always will be. And to those who care that it should be so there is the assured prospect of a larger interest in life—something beyond the mere business of bread-winning—an important enough matter which no wise man would play fast and loose with, but still it seems to me, a rather dreary object to live for, if it is all.

I think the wise people who preside over this Society must more or less share these opinions They maintain a very admirable means of keeping alive the intellectual activity of the members in the *Pharmaceutical Journal*. This keeps the whole profession, and a good many other people besides, well posted up in all that concerns pharmacy and most matters that bear upon it directly or indirectly.

All of you at some time or another may have something to contribute to its long array of solid volumes. It is with no small pleasure that I see something of our Kew work from time to time find a place in them. We cannot do much more than clear up the history of obscure drugs. But for this our far-reaching correspondence with people in all parts of the world gives us undoubted facilities. I suppose we caught the impulse from our honoured friend Daniel Hanbury, who rarely visited us without some problem in hand. I confess that when I turn over the pages of the 'Pharmacographia'—to me one of the most fascinating of books—and come on some point which the authors had been obliged to leave unsettled, it seems like a resumption of the broken

intercourse to take it up and if possible carry it to the desired solution. The scientific officers of your Society are, as I think is right, even more eager than we are. And it is fortunate that in the Government offices in London which have to do with our great dependencies and with our external relations there is no feeling of indifference to what must often seem to the uninitiated petty objects of inquiry. Without the aid of the Colonial Office we could not have got the long standing question cleared up as to the origin of *Cassia lignea*, a spice repeatedly mentioned in the Bible, and I might give many more examples.

I do not know that the actual progress of practical pharmacy is very closely bound up with these inquiries. But, at least, it is a rational desire to wish to know the exact truth about things. But fashion changes; many drugs of long sanctioned usage from time to time drop out of use. And it is absurd that we should be actually ignorant of what for centuries the human race has been doctored with. It is but the other day that we ascertained the real plants producing Socotrine aloes and the dragon's blood of the same island, the cinnabar of Dioscorides. As to drugs which hold their own, it is of the last importance that we should accurately ascertain what are their sources, so that if the natural means of supply should fail we may transfer the cultivation to other countries.

I must confess, however, to a belief that there are immense possibilities of addition to empirical pharmacy. The European Pharmacopœia, I suppose, derives its origin from the medicine of the middle ages, when the reputation of drugs rested on anything rather than their ascertained physiological action. A friend not long since was good enough to send me a copy of a sixteenth century book, which is, I daresay, in your Library, the 'Phytognomonica' of Baptista Porta. My friend, being a collector of mathematical books, bought it thinking that it treated of dialling; it could hardly go less astray from the aim of rational therapeutics if it had. The Doctrine of Signatures, as it was called, is said still to survive amongst us, when we put saffron or a rusty nail into the water given to a canary. It was here, at any rate, rigidly carried out. For example, Porta recommends oak bark and resin as local applications for skin affections; not, as we should say now, because they are astringent and stimulating, but because plants which readily shed their cortical tissues are proper for restoring those of mankind. We may wonder how much of this still lurks in the unchallenged tradition of our practice. Our materia medica is not quite as varied as that of the Chinese, to which nothing—even a pounded fossil brachiopod—seems to come amiss. But my own experience of materia medica has made me very sceptical as to a good deal that still has official sanction.

I confess that I have great hopes of a new harvest of really effective drugs from a careful study of the remedies in use by savage or partially civilized races. These rest on the soundest of all foundations—the test of experience. I will, if you will allow me, illustrate my position by reading you a passage from a book which came into my hands the other day and which is much more worthy of attention than the rather flippant title, 'Camping among Cannibals,' would lead anyone to suppose. It is only one of many passages which time will not allow me to quote.

"The knowledge the Fijians have of herbs and simples must be very excellent and extensive. They have cured him (the skipper) of an attack of dysentery, when the best European advice he could get here, from men of war and other ships, had utterly failed. The old women take you in hand and bring you decoctions and infusions of leaves, which they make you drink while they stand by, to see that you save none of the leaves and so learn their carefully hidden secret. If they send you medicines, the leaves of which they consist are always chewed or pounded out of shape. Their knowledge of poisons is great, and was extensively used by chiefs for political purposes, removing by this means any dreaded rival or dangerous foe."

That valuable drugs have already been derived from such sources it is easy enough to show. The study of the properties of pituri, obtained from Australian aborigines, led to the identification of the plant and the further discovery of duboisin by Bancroft. Such a careful study as has been recently made by Dymock into the drugs of western India is a pattern of the kind of research which is everywhere needed. It was curious to remember in a recent controversy as to the activity of jequerity seeds (*Abrus precatorius*) that they have been used from time immemorial for secret cattle poisoning in India.

I have a strong suspicion that it is the mediæval flavour, if I may so express it, that hangs about our pharmacy which has of late engendered a considerable scepticism about the action of drugs altogether. And this is by no means a popular heresy only, but it is an attitude shared by many very capable members of the medical profession. With such men I am afraid the interest of a case rather seems to stop with what they call "the confirmation of the diagnosis." The practical and common-sense world will, however, always demand that the medical art shall go farther than this. I am bound to say I am entirely of the same opinion. It is for this reason that I am anxious to see our list of first-class drugs—such as quinine and ipecacuanha—very much increased. I can conceive an ideal therapeutics, in which we should have drugs in our *répertoire* which would stimulate or inhibit every function of the organism. An unfortunate obstacle comes, however, in the way in the shape of the fact that there is in this country sur-

prisingly little disposition to engage in the investigation of new remedies. The study of rational therapeutics can hardly be said to exist; at the most it is attacked in a disconnected or spasmodic fashion by men who have too much else to do.

As an illustration of the difficulty of settling even promising problems taken up may mention a case in my own experience. At the time that Mr. Darwin was engaged in his work on Carnivorous Plants I was in frequent correspondence with him about it, and as about the same time Sir Joseph Hooker chose the subject for an address to the British Association at Belfast I was naturally led to look a good deal into its literature. I called to mind the stories so constantly repeated by travellers of the effect of the foliage of the Papaw Tree in rendering meat wrapped in it tender. I earnestly entreated the physiologists of my acquaintance to have the properties of the Papaw thoroughly examined. I did indeed induce one friend, by persistent pertinacity, to make some superficial experiments which led to nothing of importance, while another would not even admit that it was worth investigation. Eventually the problem was taken up by the distinguished French chemist, Wurtz, and carried to a triumphant conclusion. The existence of a ferment, papain, very similar to pepsin, was discovered. The substance was isolated and is now, I believe, manufactured for therapeutical purposes. And you may imagine the vexation I have felt at having specimens shown to me as a scientific novelty. Nor is this all. As I learn from a recent lecture delivered by Professor Hartley, the study of papain has thrown light on the general nature of the changes brought about by the class of bodies to which it belongs. These changes there is good reason to suppose may all be included in the kind of chemical change to which Professor Armstrong has given the name of hydrolysis. The large molecule of the fermentible substance, under the influence of the ferment, is led to enter into combination with water and is then resolved into two or more molecules of lesser weight, the ferment being regenerated.

Well, this may be thought a too isolated and personal experience. I suspect it is not so; and I take leave to quote in support of my opinion the even stronger words of one of your past Presidents, Mr. Greenish, from the pages of your own Journal: —"The *Perezia* may prove a valuable medicinal plant, but to determine that point there are yet wanting those careful therapeutic investigations which should precede the appearance in general practice of any new drug, a series of well-conducted experiments which very few seem capable of conducting, and for the results of which still fewer have the patience to wait."

Another field of investigation, not so closely connected with pharmacy perhaps, is the mode of origin in the plants themselves of the principles of which we make so much use. I observe, however, that the editor of your Journal is by no means neglectful of the interests of vegetable physiology, at any rate of that part of the subject which is connected with what is called the "metabolism" of plants. This is a wise judgment, if only on the ground that it is at any moment possible that some highly practical result may flow from it. At present, however, we are, as I have said, almost wholly in the dark about these principles. Active as are their effects on the animal organism, their properties seem, as regards the plants which elaborate them, purely accidental. What possible meaning can we attribute, for example to a ferment as effective as rennet in coagulating milk, in the berries of a solanaceous plant? It would obviously be very convenient to be able to control the production of some of these bye-products of plant life. But except the experience of Broughton, in increasing the yield of cinchona alkaloids by adding to the supply of nitrogen in the soil, I call to mind no tangible results in this direction.

I think what I have said shows that we are in want of something that would crown the work of an institution like this—a provision for the systematic advancement of the higher branches of pharmacology and of subjects allied to it. This would necessarily be something altogether apart from the regular curriculum of students' work. But it would afford facilities for those who were content to prolong their studies to do something under skilled guidance in the way of research. I do not know that in any equitable sense it could be expected that this Society should undertake, or undertake alone, such a responsibility. What I am suggesting is only, after all, one detail in a vision of that great and comprehensive university organization for the higher studies which ought to have its seat in London. With such an ideal university the work of such an institution as this would doubtless be in some sort of federal relationship, and there would be no valid reason why the work done here should not step by step proceed through the portals of research to the recognition of an academic degree. We have had two chances of a metropolitan university. The first, Gresham College, still survives in the last extremity of functional atrophy. But its structural organization is still intact and sound enough; it possesses a number of chairs, including one of medicine. It is not inconceivable that a vigorous development might yet bring it into the reality of active life. Our second chance yielded us, as you know, a most valuable institution, but, still, one which is not a university except in name, but a Government institution wholly given up to the business of examination. The University of London has, however, a solitary professor, and in time to come his isolation may be comforted with colleagues.

Lord Bacon in a well-known passage has expressed his distrust of Universities. Perhaps, had he lived to our day, some pages of the 'Novum Organon' might have been recast, when he had taken note of what is being done at Cambridge and elsewhere. When one sees what can be done, it is not a thing to be regarded with any satisfaction that the higher scientific studies have as yet found no recognized home in this great city. But the future may in due time reveal some remedy for this. When it does I doubt not that the Pharmaceutical Society of Great Britain will be as willing to take up the fresh burden of responsibility that may be thown upon it as it has worthily borne that already on its shoulders.

INTERNATIONAL FORESTRY EXHIBITION AT EDINBURGH.

(*Concluded from page* 224.)

Johor.

Some interesting specimens are exhibited by the Maharajah of Johor. The whole process of the manufacture of gambier, or *Terra japonica*, is illustrated by photographs, and various samples of the drug in different forms are shown. Of these there are four qualities, one of which, in the shape of parallelopipeds, is used instead of areca nut for chewing with lime the betle pepper leaf. Some very fine specimens of gutta percha are here exhibited, as well as gutta taban, a similar but inferior article. Fine specimens of a resin called damar dagang and three qualities of the celebrated Baros camphor, the finest of these being in remarkably large crystals; this product is often sold at Singapore at as high a price as 10,000 guilders per picul of 133⅓ lbs., and eagerly purchased by the Chinese. A number of medicinal roots are also exhibited, but information concerning these was not obtainable.

The soft elastic bark of *Pinus longifolia* is here shown as a substitute for cork.

Japan.

This is decidedly one of the most interesting as it is one of the largest exhibits in the building. The specimens are arranged in the most practical and business-like manner, that enables the visitor to learn much concerning the condition of the science and forestry and the forest products of that singular country. The specimens of timbers are arranged so as to exhibit a dried specimen of the foliage and flowers, and a transverse and longitudinal section of the trunk and the bark, and each specimen is accompanied by a sheet of paper giving all useful details as to the value of the timber and the products obtained from the tree. The collection of drugs is a comparatively small one, thirty-six in all, and although unnamed, the deficiency is amply made up by the courtesy of the Commissioners (one of whom, Mr. Okhubo, the brother of a late student in the Society's laboratory, speaks English), who seem to have information concerning every exhibit at their fingers' ends.

Most of the drugs have been described already in the pages of this Journal. Of those not yet noticed may be mentioned the roots of bō-fu, *Siler trilobum*, Benth. and Hook.; wogon, *Scutellaria lanceolata*, Miq.; kudzu-no-ne, *Panax repens*; sai-ko, *Bupleurum falcatum*, L., and nodake, *Angelica decursiva*, Miq. Three specimens of starch are shown, one obtained from the roots of a leguminous plant, *Pueraria Thunbergiana*, Benth., another from those of *Erythronium grandiflorum*, Pursh., and a third from the rhizomes of the common bracken, *Pteris aquilina*, the latter starch being of a yellowish tint. The beautiful insect wax produced by *Aphis sinensis* on the branches of two Japanese shrubs, *Ligustrum lucidum* and *L. Ibotu*, and hence known as Ibotu wax, forms a noticeable object; it resembles spermaceti in appearance, but is much harder.

The Japanese cedar, a most useful timber tree, well known in this country under the name of *Cryptomeria japonica*, appears to yield in Japan a turpentine or semi-solid resin, which is shown here in small quantity. According to Siebold this resin, which is called by the Japanese sugi-no-jani, is very aromatic and is used to make an incense, much valued by the Buddhist priests. It is employed also in the preparation of a plaster for wounds and ulcers. The resin of *Pinus Thunbergii*, Parl., called "kuro-matsu," is applied to similar uses, and in powder is applied to recent wounds to stop bleeding. Internally it is given as a resolvent and pectoral, and is held as a specific in diseases of the lungs.

The Japanese camphor is exhibited in the crude state. Bird-lime is shown prepared from the bark of *Trochadendron aralioides*, Sieb. et Zucc., and *Ilex integra*, Thunb.; this is used by the Japanese for catching cockroaches, rats, mice and other vermin, for which purpose it is spread upon pieces of cardboard, etc.

Some boxes containing cigarettes present a tempting appearance, but the label indicates that they are made, not from *Nicotiana Tabacum*, but from the leaves of *Sterculia platanifolia*. The foliage of *Styrax obassia*, Sieb., is used for the same purpose.

The tanning materials exhibited are comparatively few and comprise the following; Japanese galls, containing from 60–63 per cent. of tannin, the catkins of *Alnus firma*, 25–27 per cent., the barks of *Myrica rubra*, 11–14 per cent., and of *Quercus dentata*, 2–7 per cent. Besides these, pomegranate bark and an astrigent liquid called "kaki-no-shiba," prepared from the fruits of the Persimmon, *Diospyros Kaki*, is used for giving strength and durability to paper.* In this connection the wood of *Kadsura japonica* may be mentioned, which contains a quantity of mucilage and is also used in paper making.

As dyeing materials there are exhibited a yellow laminated bark, which has been variously referred to *Pterocarpus flavus* and *Euodia glauca*, but is here stated to be the inner bark of *Phellodendron amurense*; *Imperatora tinctoria*, a grass yielding a yellow dye, and gardenia fruits, which give a saffron colour.

A perusal of the descriptive sheets attached to each exhibit of sections of trees, reveals some interesting information. Thus we learn that maple sugar, a specimen of which is exhibited, is obtained from *Acer argutum* and *A. japonicum*; that oils are obtained from the fruits of *Excœcaria japonica*, *Elœococca cordata*, *Camellia japonica* and *C. Sasangua*; and waxes from the seeds of *Cinnamomum pedunculatum* and *C. Camphora*, and from the fruits of *Litsœa glauca*, *Sapium sebiferum* and *Rhus vernicifera*, the strong wood of *Zelkowa Kaki* being used for making oil presses.

The leaves of *Andromeda japonica* and the bark of *Picrasma ailanthoides*, of which fine specimens are exhibited, are employed as vermifuges; the wooden toothcombs and haircombs which are exhibited, are manufactured from the wood of *Olea Aquifolium*, *Hovenia dulcis*, *Pyrus Ussuriensis* and *Buxus japonica*, the last named being hard enough to be used in making seals, buttons and abacus counters. Some of the woods used by the Japanese for engraving purposes seem worthy of trial in this country. Of these may be mentioned *Magnolia hypoleuca*, which is employed also for lead pencils, *Prunus pseudo-cerasus*, *Distylium racemosum* and *Ilex crenata*. The hard wood of the Japanese pepper plant *Xanthoxylum piperitum*, is used for making pestles. Toothbrushes are made in various forms out of a soft fibrous wood, one end being generally frayed out and the other sharpened off so as to answer as a toothpick. Some, however, are frayed

* See *ante*, December 25, 1880, p. 510-511.

out at both ends, the one end more so than the other; this is intended for washing out the mouth. They are probably cheap enough to be used once and then thrown away. *Viburnum Opulus*, a shrub which is also common in this country, and *Populus tremula*, also an English tree, afford the woods used for this purpose, as well as *Lindera triloba*, a Japanese tree.

A very ingenious chopstick made from the wood of *Nandina domestica* is almost as good as a puzzle. It consists of a piece of wood about the size of an ordinary lead pencil, but with square edges instead of being cylindrical. It is evidently split only four-fifths of the distance and when the two pieces are pulled apart, so as to form two chopsticks, a toothpick falls out of a hollow in one of them which extends partly below the end of the split portion into the solid wood. Like the apple in the dumpling, the puzzle is to know how it got there. This is done when the wood is wet, the toothpick being then inserted in a cavity made for it by a tool used for the purpose.

The Japanese lacquer tree is illustrated by a fine series of specimens. A coloured drawing of the flowers and leaves is shown, painted on the wood of the tree itself, and framed with longitudinal sections of the branches. Thus the whole of the plant, wood, bark, leaves and flowers are represented within the space of a single foot square. A series of the products of chemical analysis of the natural varnish, including a good specimen of urushic acid, with the lacquer, the berries and the wax obtained from them, and the natural varnish in the dried state are also shown. These are accompanied by an important essay. The ingenuity of the Japanese is very evident in several other exhibits; thus the hollowed out trunks of trees are made to serve as drain pipes; the strong but thin fibrous paper is used, when required, as string by merely rolling it between the finger and thumb into a thread, and it is then amply strong enough for the purpose.

British Guiana.

A very large number of forest products from this country are exhibited in the central transept, opposite to the Indian collection, but many of them have only the native names, and the catalogue affords no particulars concerning the uses of many of the barks, seeds, etc. The specimens of anime, gutta percha and balata are very fine, and the tonquin beans are of large size. Several seeds, judging from appearance only, seemed worthy of examination, one of these closely resembles St. Ignatius' beans in shape and horny consistence, but is much smaller in size. Another is a species of *Andira* which is likely to possess medicinal properties. The seeds of *Abrus precatorius* here exhibited are of a brown colour, the usual black spot at the end being only of a somewhat darker brown colour. Among other products employed in medicine are wallaba bark, *Eperua falcata*, used for toothache, *Nectandra Rodiæi*, crab oil, the product of *Carapa guineensis*, etc. The curious fruits of *Hura crepitans*, whose seeds yield an oil, are prevented from splitting by the simple expedient of pouring a little melted lead into the centre of the fruit so as to fasten the carpels on the axis. It is much to be regretted that so little is known as yet of the products of a colony so rich in natural objects.

St. Vincent (143).

Although small, this exhibit is rather rich in pharmaceutical articles, cowhage pods, castor oil seeds, arnatto, arrowroot, nutmegs, cloves, and *Cassia fistula* are familiar objects. The root of bastard ipecacuanha (*Asclepias curassavica*), the seeds of the manchineel tree, and the oil seeds of *Jatropha Curcas*, and *Aleurites triloba* are not so well known. Here also are exhibited jequerity seeds of the ordinary brilliant red and black colour, and the somewhat similar but larger seeds of *Ormosia dasycarpa*; from the last-named seed an alkaloid has recently been obtained by Merck, and has received the name of ormosine. The fruits of the towel gourd, *Luffa ægyptiaca*, are shown in the form of ornamental basket work instead of as flesh gloves. A very beautiful specimen of elemi, catalogued as gum opal, is here shown, but its botanical source is not apparent. Bread fruit starch is another little known product in this country which might be mentioned as worthy of notice. Tadehouna bark, the botanical name of which is not given, is said to be used by the Caribs and others in the form of infusion for dysentery.

The seeds of the Frangipanni trees, *Plumieria rubra* and *alba*, are also shown.

In the Tobago exhibit nutmegs are shown in the form of a pickle, which is stated to be far superior to that of walnuts, and certainly they present a more tempting appearance. This concludes the list of colonial exhibits so far as their interest to pharmacy.

An interesting series of barks of species of Acacia, including those of *A. dealbata* and *A. melanoxylon*, cultivated in the South of France, are exhibited by Messrs. Vilmorin, as tanning barks. The experiments made by this celebrated firm show that these trees will yield a more profitable return than oak for tanning purposes in the countries where they will grow, inasmuch as their quicker growth enables them to produce more bark in a given time, and although it is not so rich in tannin, the larger amount of it gives a larger yield of tannin in consequence.

Of what may be termed the trade exhibits, and which chiefly occupy the centre of the building, one or two demand a brief notice.

Messrs. A. B. Fleming and Co. exhibit a trunk of *Pinus australis*, from Wilmington, North Carolina, showing the mode of obtaining the turpentine by removing the bark and letting the resin trickle down into a cavity near the base of the trunk; also fine specimens of rosin oil, which is now largely used in the preparation of lithographic ink.

Some fine specimens of resins and varnishes are also exhibited by Mr. R. Tait, pharmaceutical and manufacturing chemist, Edinburgh, and Messrs. Craig and Rose. Only one exhibit of pharmaceutical preparations, by Messrs. Lorrimer and Co., of London, is to be seen, and this is limited to preparations of cinchona barks and the alkaloids and scaled preparations made from them.

On the whole, the Exhibition may be regarded as a decided success and doubtless will result in greater attention being drawn to the importance of forestry and forest products to this country and its dependencies, while the interchange of information concerning the methods adopted in different countries cannot fail to be of advantage to the students of the subject in this country.

INFLUENCE OF LIGHT ON THE DISENGAGEMENT OF OXYGEN BY PLANTS.*

BY J. REINKE.

The author describes the means adopted by him to measure the oxygen disengaged by leaves in presence of light of varying intensity, by counting the bubbles of gas which escape from a given leaf surface of an aquatic plant in measured intervals of time. *Elodea*, having very thin leaves, is especially suitable. The light of the sun is reflected from a heliostat through a convex lens into a darkened chamber. The intensity of light to which the leaf is subjected then varies according to its position in the double cone of rays formed by the lens. Working in this way the author finds that the disengagement of oxygen attains its maximum with light of normal intensity (*i.e*, at twice the focal distance of the lens, where the diameter of the cone of rays is the same as that of the lens), that it diminishes rapidly, with intensities of $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$; but on the other hand remains almost constant when the intensity is two, four, and eight times the normal.

The author has adopted his method of counting the number of bubbles of gas escaping from a given leaf surface of an aquatic plant (*Elodea*) in a given time to the study of the influence of light of different colours on the disengagement of oxygen by plants. The same apparatus was employed as that previously described with the intsrposition of a prism of known dispersive power adjusted for the minimum angle of deviation, in the path of the conical beam. The spectrum was received on a screen, composed of two vertical plates of wood, adjustable at any distance from each other. The band of coloured light passing between the wooden uprights was concentrated on the leaf by a lens, the distance between the uprights being so adjusted for each colour as to obtain an equal luminous concentration (*i.e.*, an equal number of wave-lengths) in all cases. The maximum disengagement of oxygen corresponds with the maximum absorption of chlorophyll, and is situated in the red, not far from the line B; the curve descends rapidly towards the ultra-red, more slowly towards the ultra-violet, but contrary to the experiments of Engelmann, there is no augmentation in the disengagement of oxygen, corresponding with the absorption-band commencing between the lines *b* and F, and extending over the whole of the right side of the spectrum.

ACETATE OF MAGNESIUM.†

BY A. F. W. NEYNABER, SEN.

This preparation has not been brought as fully to the notice of physicians and pharmacists as it undoubtedly deserves. It possesses qualities which entitle it to a better consideration. Acetate of magnesium is very soluble in alcohol as well as in water, so much so that this quality has been spoken of as an objection to its general use, whereas, if we look at it in the proper light, this is one of its great advantages, since it enables us to use it with elixirs, wines, syrups, tinctures, fluid extracts, etc. For all these preparations it can be combined with some pleasant aromatics, with laxatives, such as rhubarb, mandrake, leptandra, etc., in neutral solutions as well as with an excess of acid, such as citric acid, tartaric acid, etc. It acts as a purgative, and if combined with rhubarb, jalap, mandrake, leptandra, buckthorn, senna or other laxatives or cathartics and purgatives a very valuable composition is formed. To illustrate its usefulness and to show in which way it may be dispensed several formulas are given below, yielding preparations which are stable and can be kept any length of time without undergoing any change, while all preparations containing citrate of magnesium have the great disadvantage of not being stable.

It is a well-known fact that many of the preparations in the market sold as liquid citrate of magnesia, citrate of magnesia granules, etc., contain a very small percentage of the citrate of magnesium, while the bulk is made up of tartrate of sodium, citrate of sodium, etc., because the pure citrate of magnesium is apt to undergo changes which render the preparation insoluble and unsaleable.

If we use an exact quantity of calcined magnesia in making the acetate, and then evaporate to a given weight, we can make exact calculations of the strength of the liquid.

In the following are given some practical formulas for the combination of acetate of magnesium with other laxatives, cathartics, etc.

Tincture of Rhubarb and Magnesia.—Calcined magnesia, 2 ounces; acetic acid, a sufficient quantity. Evaporate to 5 fluid ounces and 5 fluid drachms. Add ext. rhubarb, 2 fluid ounces; fluid ext. cardamom, 3 fluid drachms; alcohol, 8 fluid ounces. Mix = 1 pint.

Elixir Cathartic.—Calcined magnesia, 240 grains; acetic acid, a sufficient quantity; fluid extract of Culner's root, $\frac{1}{2}$ fluid ounce; fluid extract of butternut bark, $\frac{1}{2}$ fluid ounce; fluid extract of Alexandria senna, 2 fluid ounces; flavour, a sufficient quantity; simple syrup, 4 fluid ounces; deodorized alcohol, 4 fluid ounces; citric acid, 40 to 60 grains; water, sufficient to make 1 pint.

Elixir laxans (Laxative Elixir, mild).—Calcined magnesia, 120 grains; acetic acid, a sufficient quantity; fluid extract of Alexandria senna, 2 fluid ounces; fluid extract of coriander, 2 fluid drachms; deodorized alcohol, 1 fluid ounce; simple syrup, 4 fluid ounces; citric acid, 30 to 60 grains; water, sufficient to make 1 pint.

Elixir of Rhubarb and Magnesia.– Rhubarb, 10 grains; magnesia, 5 grains to the tablespoonful dose.

Calcined magnesia, 1280 grains; acetic acid, a sufficient quantity; fluid extract of rhubarb, 5 fluid ounces and $2\frac{2}{3}$ fluid drachms; deodorized alcohol, 2 pints; simple syrup, 2 pints; flavour to suit taste; water, sufficient to make 1 gallon.

If desired, citric acid can be added, say about 30 to 60 grains, according to taste.

The U.S. Pharmacopœia of 1880 has the following modified formula for *Liquid Citrate of Magnesium*, using carbonate in place of calcined magnesia as required by the U.S. Pharmacopœia of 1860:—

Carbonate of magnesia, 200 grains; citric acid, 400 grains; syrup of citric acid, 1200 grains; bicarbonate of potassium, 30 grains; water, a sufficient quantity to fill a bottle of about 16 fluid ounces.

To replace this by acetate of magnesium, I would propose the following formula:—

Solution of Acetate of Magnesium.—Carbonate of magnesium, 200 grains; acetic acid, sufficient quantity to neutralize; syrup of citric acid, 1200 grains; bicarbonate of potassium, 30 grains; water enough to fill a bottle of about 16 fluid ounces.

Liquor Magnesiæ Citratis (U.S. Pharmacopœia, 1860).—Magnesia (calcined), 120 grains; citric acid, 450 grains; syrup of citric acid, 2 fluid ounces; bicarbonate of potassa, 40 grains.

To replace this by acetate of magnesium the following formula might be used:—

Liquor Magnesii Acetatis, or Solution of Acetate of Magnesium (Magnesia)—Calcined magnesia, 126 grains; acetic acid, sufficient quantity to saturate; syrup of citric acid, 2 fluid ounces; bicarbonate of potassa, 40 grains.

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* From *Ann. Agronomiques*, x., 30—40, and 136—137. From *Botan. Zeitung*, 1883, Nos. 42, 43, 44. Reprinted from the *Journal of the Chemical Society*, October, 1884.

† From the *American Journal of Pharmacy*, September, 1884.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 4, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelop s indorsed "Pharm. Journ."*

THE NEW SESSION.

THERE is so close a family resemblance among the "Introductories," of which a large number are held about this season of the year, and especially among those held year after year in the same place, that a little *ennui* might well be excused even were it occasionally manifested at such meetings. Taking, for instance, those in connection with the School of Pharmacy of the Pharmaceutical Society of Great Britain, it would not, we hope, be held disrespectful to say that there are the same Professors reporting on the doings of their respective classes almost necessarily nearly in the same phrases as on many previous occasions ; a number of young men, as like in the eye of the superficial observer to their predecessors in the same position as peas to one another, receiving the prizes to which by their ability and perseverance they have become entitled ; and an able speaker striving, with more or less success, to cover the same good wholesome advice which has been addressed to successive generations of students with some of the graces of novelty. Yet notwithstanding this apparent sameness there are perhaps no meetings held in the theatres of the schools from which *ennui* is so uniformly absent, for the not yet blunted enthusiasm of students in their novitiate, the incompletely repressed excitement of the recipients of honours and their sympathizers, the latter being by no means limited to immediate friends, and the intellectual feast which the address usually affords, are as a rule quite equal to the task of laying such a ghost did it appear at the banquet. Nor was the occasion of the distribution of prizes and the delivery of the inaugural address by Mr. W. T. THISELTON DYER on Wednesday evening last an exception, the interest of the audience that thronged the theatre having been maintained unbroken throughout the two hours during which the proceedings lasted.

It will be a source of satisfaction to well-wishers to pharmacy in this country to find that the School of Pharmacy round which the proceedings of the evening centred shows evidence of continued efficiency and that an object which has cost the Pharmaceutical Society much thought and money, namely, the maintenance of a high standard of pharmaceutical education, is as earnestly cared for as ever. For it must not be over-looked that the prizes distributed on Wednesday meant more than an indication of the results of a competition by the students in a particular school *inter eos*. This may have been the case with a large proportion of them, but, as pointed out by the President, three of the most important, known as the "Council Examination Prizes,"—among which is the Pereira Medal, the blue riband of pharmacy,—are open to all comers for competition upon equal conditions. Many a former pupil in Bloomsbury Square will be pleased to observe that once more the Pereira Medal has been carried off by a student in his *alma mater*, and we may confess we heartily share the satisfaction. This has, however, now been an unbroken experience during a long series of years, and, moreover, we may observe that on the few occasions when the Society's School failed to produce a man equal to the task of winning the medal the gap was not filled from any other establishment, every such year, in fact, in respect to the Pereira Medal being an *annus non*. We do not make this remark with any wish to decry the merits of independent schools, the prosperity of which, when conducted on sound principles, it has always been the policy of the Society to foster. But facts are facts, and we think the one mentioned is a fact which the Professors in the Society's School, as well as the governing body with which it has always been an object of great concern, may contemplate with a certain degree of pride. At any rate, it may fairly be put forward as indisputable evidence of the efficiency, as a teaching establishment, of the school which the liberality of the Pharmaceutical Society has provided to meet the needs of intending students in pharmacy and the allied sciences.

The address delivered by Mr. THISELTON DYER, which is printed in another part of this Journal, will no doubt be read—as it was listened to from beginning to end—with extreme interest. It is valuable as showing the estimation in which the Pharmaceutical Society and its operations are held by an eminent public man, who, although not an adept in pharmacy, has acquired eminence in connection with at least one of the sciences upon which the art is based. It is perhaps still more to be prized as containing advice to young students from one, who like the speaker last year, knows the troubles of both examinees and examiners. Speaking with this double qualification, Mr. DYER, it may be noted, does not appear to regard examination, *pur et simple*, as the unmitigated evil it is the fashion to esteem it in some quarters, although he emphatically manifested throughout his address his preference for its association with a systematic course of education. The utilization of his own experience in the examination room—where subjects that he had studied unduly in detail appeared to be ignored by the questioner, whilst others that had been neglected in consequence cropped up persistently—to illustrate the usefulness of a prospective examination in checking a tendency

to discursive study was carried out with a dry humour that gave it great force. In a similarly effective manner, Mr. DYER used his personal experience as a student to point his remark that cramming is in more cases to be attributed to a defect in the scheme of education than to inherent vice in the student, and a similar remark might have been made with regard to a defective syllabus of an examination. From his vantage ground as an examiner also, Mr. DYER speaks with great weight in his advice to students as to the manner in which they should pursue their studies; every line is worthy of being most carefully taken into consideration, especially that portion where he points out that assiduity and intelligence are insufficient if the student neglects to avail himself of the vastly improved methods of teaching which have done so much to lighten the labours of the new generation. There are also many other points in the address that have a wider application than to young students, which are important as evincing the unbiassed opinion of an intelligent outsider upon subjects of special interest to pharmacists, but we can only refer to two of them on the present occasion. We are glad to note that men outside pharmacy are surprised at the "most extraordinary arrangement" under which materia medica, pharmacy and practical dispensing are at present included in the otherwise overburdened medical curriculum and look forward to the time when they will be eliminated from medical studies. We also notice with, we think, excusable satisfaction the endorsement of the views frequently, though apparently almost fruitlessly, urged in these columns, to the effect that the possibility should be steadily kept in view of the pharmacist serving the community in the performance of duties that shall utilize, to a greater extent than at present, the scientific training which is appropriately associated with his period of pupilage.

In his presidential address to the Society of Chemical Industry, three months ago, Mr. Weldon sarcastically remarked that Nicolas Leblanc, who put an end to his own existence because he lacked bread, had after two generations received a stone statue. The remark turns out, however, to have been more epigrammatic than true, since up to the present time no statue to Leblanc has been erected. Indeed the same cruel fate that dogged the great pharmacien inventor while living seems to be still attendant upon his memory. It appears that since 1856 four distinct attempts have been made to secure the erection of such a statue in Issoudun, the town in the Indre department in which it was supposed Leblanc was born. The last and most hopeful one was set on foot only last year (see vol. xiv., 189), but before any funds could be collected the publication of some papers that had fallen into the hands of M. Anastasi, a grandson of the inventor, revealed the fact that Issoudun was not Leblanc's birthplace. Although the real spot was only a few leagues removed, the fact seems to have been seized by the local authorities as a pretext for washing their hands of the affair, and it was decided that in Issoudun a statue of Leblanc would no longer have a *raison d'être*. Still another attempt, appealing to wider sympathies, is now being made, in which—such is the irony of history—Messrs. Solvay and Co., the manufacturers of soda by the ammonia process, who have dealt the Leblanc soda industry the severest blow it has yet received, appear to be taking a prominent part. It is now proposed that a statue should be placed either in the *cour d'honneur* of the Conservatoire des Arts et Métiers or at St. Denis.

* * *

The past week has been marked by another cry from the medical profession for the abolition of the patent medicine stamp, the reasons given on the present occasion being the inducements and facilities which, in connection with the practice of insuring children's lives, it affords for the practice of infanticide. The discussion was started by a letter signed M.R.C.S., that appeared in the *Times* on Monday, and the *British Medical Journal* sums up and endorses the writer's opinion by saying that "there is no doubt that this abominable system [of selling under the cover of the patent medicine stamp proprietary preparations containing poison] is a direct premium on infanticide." It adds that whilst a poisonous drug is sold by qualified chemists and druggists only, the poisonous patent medicine can be sold by any huckster who chooses to pay a few shillings for a licence.

* * *

A recent report of the Michigan State Board of Health deals with the subject of a large number of cases of poisoning by cheese that had taken place a short time previously. The whole of the cases, 164 in number, had been connected with the eating of cheese from one manufactory, and the symptoms were pain and a burning sensation in the stomach, intense vomiting and purging, feebleness of the pulse, coldness of the extremities and a tendency to collapse. An examination of the cheese factory had shown it to be scrupulously clean, nothing in the utensils or surroundings affording any explanation as to the cause of the poisoning. Moreover, the cheeses on analysis yielded no metallic impurity. They were externally of good appearance, but upon being cut or broken a whitish liquid oozed from them which was strongly acid. The reporters appear to have regarded this liquid as the source of the mischief, and recommended that the prompt reddening of litmus paper when placed in contact with the freshly cut surface of a cheese should be taken as an indication that it is open to suspicion.

* * *

It is reported that in the Gila river district, in the south-west of Socorro county, New Mexico, there has been discovered "almost a mountain of alum," extending over a superficial area of more than a square mile, and rising in some places to an elevation of seven hundred feet above the bed of the river. Most of the alum appears to be in an impure state, tasting strongly of sulphuric acid, but, nevertheless, some of the cliffs are said to show immense quantities of alum in a marketable condition.

* * *

A special general meeting of the Chemists Assistants' Association will be held in its rooms, at 103, Great Russell Street, on Wednesday next, October 8, to consider the advisability of amending the rules relating to honorary membership, and to transact miscellaneous business.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, October 1, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Andrews, Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Savage, Schacht, Squire, Symes, Williams, and Young.

The minutes of the previous meeting were read and confirmed.

Pharmacy in Denmark.

The Vice-President said he had recently had the pleasure of visiting Denmark and the adjacent countries, and had received such very marked kindness from two eminent pharmacists, Messrs. Madsen, of Copenhagen, and Lotze, of Odense, that he was very desirous of making some public acknowledgment of it, especially as he felt that the attention which had been paid to him was due to his connection with the Pharmaceutical Society of Great Britain. He could, at the same time, convey to eminent pharmacists in England, whether members of the Council or not, very kind messages from the two gentlemen referred to, who retained very pleasant remembrances of the hospitality and attention shown them in 1881 when attending the International Pharmaceutical Congress. He could simply say that the kindness extended to him was only limited by his ability to accept it. Mr. Madsen insisted on his leaving the hotel and staying with him, and he might add that it was well worth a visit to Copenhagen to see his splendid establishment. He had recently expended some thousands of pounds in enlarging the laboratories, which were adapted not only for pharmaceutical purposes, but also for scientific research, and they formed one of the principal features of Copenhagen. As they were all aware, pharmacy in Denmark was in a very different position to what it was in England, there being only twenty pharmacists to a population of two hundred and fifty thousand. At Odense he met Mr. Lotze, who was also exceedingly kind; he had not only a large dispensing business, but was one of the leading manufacturing chemists of Scandinavia. The great charm of his place was his splendid gardens. Mr. Lotze was a scientific botanist, and his gardens and glass houses, in which flowers and plants from all parts of the world were acclimatized, were sources of attraction to all Denmark. Besides this, he was a man of wide general culture, and was now collecting money for a large museum in Odense, the structure being already nearly completed. Both these gentlemen were well in touch with the Pharmaceutical Society of Great Britain; they read the Journal and were as well acquainted, not only with the advance of pharmaceutical science, but with its politics and legislation, as anyone in England. He thought it only right, having received such very marked attention, which must have been rather representative than personal, to make some public acknowledgment of it.

The President said every member of the Council would be glad to hear of the prosperity and good will of their friends in Denmark. Those gentlemen had issued from time to time very numerous personal invitations, and he hoped that other members of the Society would take an opportunity of paying them a visit. He had not yet been able to do so, but had no doubt from correspondence he had had with their Danish friends since the Congress that nothing would give them more pleasure at any time than to see English pharmacists.

Elections.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Gilkes, William Henry .....Oxford.
Holme, William Assheton .....Northampton.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Broumpton, Frederick Richard. London.
Gardiner, David .....Dundee.
Shepherd, Robert James.....Wisbeach.
Turner, Thomas .....London.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Brearley, Richard Garbett.....Torquay.
Center, Joseph Allan .....Edinburgh.
Clarke, Arthur Bertram .....Coventry.
Coles, Arthur .....Uxbridge.
Crook, George .....Southport.
Fraser, Robert .....Macduff.
Herbert, Henry Bertram.....Bath.
Hodder, George William.....Frome.
Livesley, Thomas Henry.....New Mills.
Lowther, William... .....Swansea.
McIntyre, Francis Gibb .....Glasgow.
Mohun, Charles Thomas.....Herne Bay.
Paul, Henry Stanley .....Birmingham.
Palmer, Edward Charles.....Landport.
Readman, Edward James .....Newport Pagnall.
Riley, Thomas Herbert .....Chapel Allerton.
Todd, Charles .....Carlisle.
Voisin, Ernest Osmond Bishop. Jersey.
Wharton, John.....Grimsby.
Wood, Charles Henry.....Holloway.

Restorations.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Restorations to the Register.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Benjamin Crompton, 2, Fern Bank, Moston Lane, Moston, near Manchester.
Samuel Charles Newman, Bristol.
Robert Brady Wade, Southdown Road, Shoreham.

Addition to the Register.

The Registrar reported that—

James Andrew Davis, Anderton Road, Sparkbrook, Birmingham,

having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported by a qualified person, his name had been placed on the Register.

Reports of Committees.

FINANCE.

The report of this Committee was read, recommending sundry accounts for payment.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£5 to the widow (48) of a registered chemist and druggist and former annuitant. Applicant has had three previous grants. Norfolk.

£10 to the widow (44) of a chemist and druggist member. Essex.

£5 to the widow (54) of a registered chemist and druggist. Essex.

£10 towards the support of the Isherwood orphans.

Election of Annuitants.

Two cases had been deferred for further inquiries.

The Secretary had reported that two annuitants had died during the year, leaving thirty-nine on the list, viz., thirty receiving £35, and nine receiving £30, making a total expenditure of £1320. He had also reported that the amount of annual subscriptions received this year, up to the end of September, had been within a few pounds of the amount received during the corresponding period last year. The Committee having regard to the probable income for the ensuing year, recommended that six annuitants be elected in December next, and that the election be held on Friday, December 5. Ten names had been placed on the list of approved candidates, in addition to those of the two unsuccessful candidates at the last election.

The VICE-PRESIDENT, in moving the adoption of the report, said there was one point which required specially emphasizing, viz., the proposal to elect six new annuitants. At present there were thirty-nine annuitants, and six more would make forty-five, a larger number than had ever before been on the list of annuitants at one time. The question arose whether the Council was justified in going to that extent. It might be said that the income from subscriptions was about stationary, which was perhaps not to be wondered at, considering the long continued depression in the trade; but there was a permanent increase to the income from interest on investments. He wished, however, to make a very emphatic appeal to the trade to give increased help, in view of the increase in the number of annuitants; for though he believed it was within the means of the Fund to do this, it would tax its resources to the utmost. Two of the unsuccessful candidates from last year would of course stand for election on the next occasion, which left four vacancies to fill, and he would appeal all the more strongly for help, because the Committee had approved the list of the twelve candidates, though those twelve by no means represented the amount of need. The Committee had a long sitting, and went fairly into the cases, and, whilst it had done its best to select the most necessitous, he felt, on looking over the list again that morning, considerable anxiety with respect to some of those who had been left. Therefore, while thankful for the help which had been rendered in the past, seeing that the Council was going on to the full extent of the means of the Fund, he did trust that the trade would generously respond to the claim upon it.

Mr. BOTTLE said it was extremely gratifying to him to be able to support the proposition to add six more to the list of annuitants. He had watched with a good deal of interest the progress of the Society, and was very glad to know that the Council was about to bring the list of annuitants up to forty-five; years gone by it was a question of being able to reach twenty, and it was very gratifying for him, therefore, to find that it was possible to more than double that number. He felt that in going up to forty-five the Council would be really stretching the point to the utmost, though he hoped it was not beyond the safe line of prudence, and that in coming years the Benevolent Fund would receive in the way of subscriptions, donations and legacies sufficient not only to maintain the forty-five annuitants, and relieve the casual claimants, but also to considerably increase the number of annuitants. He could not help seeing that the trade did not seem so promising as it did forty years ago, when he entered it, and though some might be flourishing he feared that there might be a great many more who would have to seek assistance from the Fund.

Mr. SAVAGE remarked that some time ago the Treasurer brought forward a point on which he agreed with him in the main, but he subsequently found that he was wrong, and the members of the Council generally were right. That was in connection with the distribution of the Fund, when he suggested that those who contributed nothing to the Fund should not be put in the same position as those who had been contributing for several years, and it did seem to him that there ought to be something like a preference in the latter case; but experience showed that the answer to this was that those who become applicants for relief had always been more or less in need, and had been really unable to subscribe.

Mr. HAMPSON was glad to see that the Committee had decided to recommend that six more annuitants should be elected; but still there would be six candidates who would be left over, and he often felt how sad it must be for those who were unsuccessful in such an election. He also found it very difficult to decide how to give his votes, and he wished the funds were in such a condition that annuitants might be selected without the ordeal of contest, which seemed to him a most cruel and painful process. There were twelve persons who were asked to enter into a contest of this kind, the majority of whom were incapable of making any contest at all, being already engaged in a dire contest with poverty; therefore, as a suggestion for the future, he hoped the Fund would become so well supported that the Committee would in future times in the interests of humanity be able to do away with this evil system. He knew there was another view taken with regard to it, but he could not help taking this opportunity of expressing the hope that it would be possible some day to dispense the Fund without entailing this cruel process on the applicants.

Mr. RICHARDSON said he did not like it to go forth that the Council inflicted any cruelty on those unfortunate persons who were not elected. In every charitable association, even the most wealthy, it would be found that there were always more candidates than the funds were able to meet, and he feared that if that consummation were to be attained, the Fund would probably suffer by the public and chemists generally considering there was no farther necessity for increased subscriptions. He thought a large number of candidates gave a certain impetus to the subscriptions, and he only hoped, when the report of this meeting was read, it would give a great stimulus to the more wealthy of their brethren, and that they would send in their subscriptions with more generosity. He also adopted the same painful view of the future of pharmacy as Mr. Bottle, and thought in future there would be more calls on the Fund, not only for annuitics, but also for casual aid.

Mr. SYMES observed that those who were not successful at one election had the satisfaction of knowing that the votes given them were carried forward to the next year, which of course was a great solace to them.

The VICE-PRESIDENT added that as a rule they received a small grant, even if they did not succeed in getting the annuity.

Mr. WILLIAMS protested against the word "cruelty" being used, which he feared would tend, without explanation, to destroy all public charity of this kind.

The PRESIDENT said what Mr. Hampson evidently meant was that there was an element of cruelty attached to all such processes of election, and on that point many persons agreed with him. The perfect form of charity was that in which those who were most deserving were spared the pain and expense of a competitive election.

Mr. BUTT said the idea of some persons was that the Committee should select six annuitants out and out.

Mr. HILLS said in that case the subscribers would be delegating the whole of their powers to the Committee.

Mr. WILLIAMS said that any comparison between this Benevolent Fund and other charitable associations was in its favour. Applications were made for relief which were considered by the Committee, and in most cases if deserving, a grant was made, and as an extra privilege in certain cases the name of the applicant was put on the approved list of candidates for annuities, of which the applicant had no knowledge at the time. He did not think any other charity held such a position, and therefore it certainly was not a cruelty to the applicants.

Mr. HAMPSON said he simply maintained that the process of election was a cruel one. The weakest person was placed in the least favourable position, and must lose the race, whilst those who were in such a position were decidedly the more eligible as candidates and probably would be the first elected by a committee.

Mr. YOUNG said the painful part of the process rested on the Committee, which had to do the duty of picking out those whom it conceived to be most in need. They knew from Holy Scripture that the poor would never cease out of the land; there always would be cases wherein men would be called upon to put their hands in their pockets to assist their poorer brethren, and it was well for them that it should be so. He hoped there would always be some amount of competition with regard to these annuities.

Mr. RADLEY asked if there would be any sum for investment this year from the income of the Benevolent Fund.

The PRESIDENT said that this year £1000 had been invested in the purchase of freehold ground rents.

The VICE-PRESIDENT said with regard to the word "cruelty" he knew what Mr. Hampson meant, but he was anxious that it should be laid down quite clearly that it applied to charitable elections generally, and not to this Fund in any special manner, for if friends in the country looked upon it in that light it would act as a hindrance to their subscriptions.

Mr HAMPSON said he should be extremely sorry if anything he had said should damp the benevolent feelings of the subscribers. He held loyally to the process the committee had adopted, although he still believed it involved an element of cruelty.

The PRESIDENT said he might say he cordially approved of the bold action the Committee had taken. There were many who sympathized with philanthropists like Mr. Hampson who were anxious to relieve distress without putting the applicants for relief to any unnecessary expense, but it was one of the difficulties of this world whether to *elect* or to *select*. At present Mr. Hampson would admit that the present process under the circumstances was the only one to adopt. When there were more funds, as probably there would be in time, it would be possible to devise a less public way of distributing relief. The resolution was then carried unanimously, and it was resolved that six annuitants be elected on December 5th.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor narrating the progress of cases which had been placed in his hands.

It stated that the following had severally paid a penalty of £5:—

James Thorpe, 173, Rochdale Road, Bury.
W. Bakewell, grocer, Sudbury, near Derby.

Several cases of alleged infringement of the Pharmacy Acts had been considered by the Committee. One case was recommended for prosecution, the others being deferred for further information.

The Council as usual went into committee to consider this report. On resuming it was received and adopted unanimously.

THE NORTH BRITISH BRANCH.

The PRESIDENT said a committee, consisting of himself, the Vice-President, Mr. Young and several members of the Board of Examiners in Scotland, had been appointed by the Council to consider and advise with the architect as to the best alterations to make in the Society's new premises in Edinburgh. The Committee was not yet prepared with a report, because the building was not yet finished, but he might state that by the 14th of October the alterations would be sufficiently advanced for the house to be used for students in the ordinary way, and it would be finally completed about the 23rd of October. The report, therefore, would probably be presented at the next Council meeting. It had been suggested by their friends in the North whether, on the first opening of an important building like this, in a city where there were so many distinguished medical and scientific men, it might not be a proper thing to have a conversazione. It seemed to him a very good suggestion, though he had not had time to consult anyone about it, but it did not seem to him to require very much consideration. The building would not be complete until the end of October, and it was suggested that about the middle of November a conversazione should be given by the Society, which every member of the Society would have the privilege, if he chose, to attend, and that the Committee already appointed to deal with the building should have authority on the part of the Council to invite distinguished men in Edinburgh and elsewhere. The house was large and commodious, and would accommodate about five hundred persons. It was not contemplated that this should be an annual affair in any way, and it seemed to him the suggestion was well worth consideration.

Mr. YOUNG, who supported the proposition, said he had nothing particular to add to what had been said by the President.

Mr. SCHACHT suggested that if it were not necessary to hold the conversazione in November, some other season of the year might be more attractive, and a great many would probably be going to Aberdeen next year.

Mr. YOUNG said the building would be formally opened in November, and it would be rather awkward to postpone any ceremony which might take place in connection with it.

The PRESIDENT said it appeared to him that the whole object of the meeting would be lost if it were postponed till next year.

Mr. RICHARDSON thought it should be held in November if at all.

The VICE-PRESIDENT said there were two reasons why it should be held in November: in the first place it would be absurd to defer the opening for months after the building had been brought into use; and, secondly, November was really the beginning of the season in Edinburgh, when all the professors and persons connected with the university returned after the vacation.

Mr. HAMPSON thought in such a case the Council should take the advice of their Scotch friends, and acquiesce in their proposal. He hoped also that there might be a good pharmaceutical harvest reaped as the result of what was being done.

The PRESIDENT then moved—

"That a conversazione be held in the Society's new house in Edinburgh about the middle of November next, and that the Committee appointed to superintend the alterations and fitting up of the new house be authorized to take the steps requisite to carry out this resolution, and to issue the necessary invitations in the name of the Pharmaceutical Society of Great Britain."

Mr. CHURCHILL said there had never been a conversazione held at the North British Branch before, and he hoped this one might be carried out on a liberal scale.

The motion was seconded by the VICE-PRESIDENT, and carried unanimously.

THE MUSEUM.

Mr. SCHACHT, after mentioning the fact that one of his partners, who was distinguished as a botanist, intended

to respond to the invitation published by the Curator of the Museum, asking for botanical specimens, by sending a valuable collection, suggested that the Library, Museum, Laboratory and House Committee should inquire as to what accommodation there was in the Museum for the reception of such specimens, with a view to remedying any defects which might be found to exist. The Council went into committee to discuss the subject more in detail, and ultimately the President stated that the Committee would look carefully into it.

Pharmacy Legislation.

The Council again went into committee and discussed at some length the prospects of pharmaceutical legislalation ; but no resolution was moved.

EVENING MEETING.

Wednesday, October 1, 1884.

The first ordinary meeting of the session took place on Wednesday last, the chair being taken by the President, Mr. Michael Carteighe, at half-past 8. The lecture theatre was crowded with members, students and their friends, including a good number of ladies.

The proceedings were opened by the President calling for the—

Report on the Chemistry and Pharmacy Class.

Professor Redwood said the report he had to present was in no respect less, and in some respects more satisfactory than those he had been in the habit of presenting for many years past. At the commencement of the session a year ago allusion was made to the introduction of an extended programme of instruction in his class, and he was now able to report the result of what had been done in that direction. In addition to the former course of instruction there had been supplementary afternoon lectures delivered by Mr. Dunstan, and a systematic course of instruction in organic chemistry, which, together with the instruction in practical dispensing and pharmacy, given by Mr. Joseph Ince, he had every reason to believe had been very acceptable and useful to the students. Much benefit had resulted and must continue to result from the able assistance which had been afforded him in dealing with the large subjects of chemistry and pharmacy, and especially on those subjects which he had not been able to treat at all satisfactorily. The result had been that the sessional examination had been of an unusually satisfactory nature. With reference to the first five months' examination, he could only say that it was very satisfactory, and several candidates who had obtained certificates of merit only would under other circumstances have been entitled from their answers to a medal. The greater part of the students had entered at once for the full period of ten months, and the result of the examination at the end of that period showed that several of those who had distinguished themselves on the first occasion still further distinguished themselves on the second. At that examination the Council awarded a silver medal and also certificates of honour and merit, the former being only given to those who obtained 75 per cent. or upwards of the total number of marks. He need only add that all the gentlemen whose names appear below had fully and fairly entitled themselves to the awards which had been made. He should state also that at this examination, considering the fact that additional means of instruction had been provided, the questions were especially framed by Mr. Dunstan and himself so as to make them more searching and severe than usual. He could not close without saying that the very favourable results thus obtained had been greatly due to the very talented and efficient assistance he had received from Mr. Dunstan and Mr. Ince.

The following is a list of the awards of medals and certificates to students in this class:—

Five Months' Courses.

FIRST COURSE.

Bronze Medal .....Fraser MacDiarmid.

Certificates of Merit .....
- Ernest John Eastes.
- Robert Wynne Chas. Pierce.
- Frederick Edward Johnson.
- George Frederic Callaway.

SECOND COURSE.

Bronze Medal ..... Ernest Henry Barritt.

Session. Ten Months.

Silver Medal..... Fraser MacDiarmid.

Certificates of Honour ...
- Edward Cullinan.
- Ernest John Eastes.
- Robert Wynne Chas. Pierce.

Certificates of Merit .....
- Reginald Edward Nicholls.
- Albert Wilson.
- Josiah William Steward.
- Robert Roberts.

The following are the questions that were set for these examinations:—

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES.

Hours 11 *till* 3.

1. Distinguish between (1) *A chemical compound* (2) *A mechanical mixture.* Give an instance of each and state the principal characteristics of chemical action.
2. Describe, in detail, the construction of a mercurial thermometer and state how temperatures above the boiling point of mercury are estimated.
3. How is *hydrochloric acid* gas prepared? What are its properties, and why is its formula written HCl?
4. State the action of (1) *Sulphuric acid* and of (2) *Nitric acid* upon ethyl alcohol.
5. What is meant by a continuous spectrum? Describe the spectrum of the sun.
6. Describe the processes of Elutriation, Filtration and Percolation.
7. Show how electricity may be obtained from (1) *mechanical action,* (2) *heat,* (3) *chemical action.*
8. Describe the processes of the British Pharmacopœia for the production of chlorate of potassium, and precipitated sulphur. Explain the chemical reactions which occur.
9. Which are the principal ores of iron? How is the metal obtained from them?
10. What is meant by the *specific heat* of a body, and how is it determined? Show the relation of specific heat to chemistry.

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES.

Hours 11 *a.m. to* 3 *p.m.*

1. Describe a general method of preparing the oxides of nitrogen. State the important properties and tests for each. How would you purify nitrous oxide from nitric oxide and distinguish the former gas from oxygen?
2. Enunciate the laws of the reflexion and refraction of light, and describe the passage of a ray of light through a prism.
3. What is Boyle's Law and how is it experimentally proved?

4. Describe the gold leaf electroscope and explain how it may be used to determine the kind of electricity with which a body is charged.

5. Give in detail a method for determining the specific gravity of a vapour.

6. What is meant by "latent heat"? Show how the latent heat of water may be determined.

7. Explain the terms alcohol, aldehyde and ether. Enumerate any of the above compounds that are mentioned in the British Pharmacopœia and indicate the series to which they belong.

8. How is tartar-emetic prepared? What is its chemical constitution?

9. 118·39 grams of pure mercuric oxide when distilled yielded 109·63 grams of metallic mercury. From this result calculate the atomic weight of mercury.

10. A sample of coal is found to contain 86·5 per cent. of carbon, 6·0 per cent. of hydrogen and 7·5 per cent. of oxygen, nitrogen, etc. What weight of air is necessary to burn one ton of it?

SESSION.

SILVER MEDAL AND CERTIFICATES.

Part I.—Hours 10 *a.m. to* 1 *p.m.*

1. Give two processes for the production of carbonate of sodium from common salt which are applicable on the large scale. Enlarge on their respective merits as commercial processes.

2. Describe minutely the change of state which is observed when a liquid is heated in a sealed tube. Give two explanations of the phenomenon and show how each explains the "critical point."

3. Define the terms (1) boiling point; (2) index of refraction; (3) absolute zero; (4) Boyle's Law; (5) fluorescence; (6) electrolysis.

4. Describe fully three forms of the voltaic cell, including the chemical reactions that occur when the current flows. Discuss their respective efficiencies.

5. 91·46 grams of pure silver heated in a stream of pure chlorine yielded 121·49 grams of silver chloride; the specific gravity (air = 1) of pure chlorine is 2·45. From each of these data calculate the atomic weight of chlorine. (Ag = 107·66.)

6. Propionic aldehyde and dimethyl ketone (acetone) are metameric. Show why they are termed metameric and indicate the constitution of the two bodies, giving experimental proofs.

Part II.—Hours 2 *p.m. to* 5 *p.m.*

1. Show exactly what is represented by a rational or constitutional formula, and illustrate your answer by reference to the constitutional formula of acetic acid.

2. Give general methods for preparing primary alcohols, aldehydes, monobasic acids, alkyl salts and ethers. Take the hydrocarbon ethane as an illustration and show how these corresponding compounds may be produced.

3. Describe the chemical constituents of any one of the vegetable drugs that are included in the British Pharmacopœia.

4. What is the nature of white light? Explain the formation of natural colours and of absorption spectra.

5. What is meant by heat of combination? State the general conclusions that have been arrived at in respect to the heat evolved in chemical reactions.

6. Describe generally the preparation of Tinctures, and state under what conditions you would consider it desirable to employ spirit stronger or weaker than the Rectified Spirit of the British Pharmacopœia.

The PRESIDENT then called for the—

REPORT ON THE BOTANY AND MATERIA MEDICA CLASS.

Professor BENTLEY said he should confine himself entirely to the special department which devolved upon him, his colleague Professor Redwood having relieved him from the necessity of any general remarks. The President, as an enterprising alpine climber, might find it very easy for many years to come to find a new route for his excursions, but when he (Professor Bentley) came to his particular subject of Botany and Materia Medica, he found it very difficult to speak in any language but that which he had consistently used for more than thirty-five years. He might add, however, that that language had always been of the same character, to the effect that the students of that school were model students in their conduct, diligence, and the progress they made in their studies, and that statement he could again repeat, for the members of his class left very little to be desired either as to regularity, diligence, or the progress they made; and when he spoke of progress he spoke with some meaning, because that progress was tested at every lecture. He never gave a lecture without giving, after it, half an hour to *vivâ voce* examination. The certificates and medals which were awarded carried with them no small weight, because, as they all knew, they were only accorded to those who obtained a certain proportion of marks, a proportion as high as prevailed in any educational institution. In conclusion, he had no hesitation in saying that these gentlemen were fully entitled to the distinctions awarded them, and he was satisfied that they would become an honour to the profession they had chosen.

The following is a list of the awards of medals and certificates to students in this class:—

FIVE MONTHS' COURSES.

FIRST COURSE.

Bronze Medal ..... Fraser McDiarmid.

Certificate of Merit...
- Ernest John Eastes.
- Equal: Frederick Edward Johnson.
- Equal: Richard Henry Norman.
- Equal: Josiah William Steward.
- Robert Roberts.
- Robert Wynne Chas. Pierce.
- Equal: Ernest Haworth Earle.
- Equal: Albert Wilson.

SECOND COURSE.

Bronze Medal ... . Lewis Walter Hawkins.

Certificate of Merit ..... Ernest Henry Barritt.

SESSION. TEN MONTHS.

Silver Medal ..... Fraser McDiarmid.

Certificates of Honour ...
- Robert Wynne Chas. Pierce.
- Ernest John Eastes.

Certificates of Merit .....
- Josiah William Steward.
- Equal: Ernest Henry Barritt.
- Equal: Robert Roberts.
- Equal: E. Haworth Earle.
- Equal: Richard Henry Norman.

Mr. G. F. Callaway also obtained a sufficient number of marks qualifying for a certificate of honour, but having been awarded a certificate of the same value in a former session he is not permitted by the regulations to receive another.

The following are the questions that were set at these examinations:—

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES OF MERIT.

Hours from 10.30 *till* 2.

1. What are the general distinctive characters of Phanerogamous and Cryptogamous Plants? Distinguish between Thallophytes and Cormophytes.

2. What parts may be distinguished in the fully developed cell? What is a primordial cell?

3. Distinguish between a "stem" and a "root." Define and give examples of the rhizome, corm and bulb.

4. Give a general account of the structure of seeds. What is the difference between an aril and arillode? What is a caruncle? Mention examples of official seeds with an arillode and caruncle.

5. Describe the mode of obtaining Scammony, and state the characters by which its purity may be ascertained. Enumerate its official preparations.

6. Describe the physical and chemical characters of the seeds of Strychnos Nux vomica. Mention the official preparations and their doses.

7. Describe the botanical and geographical sources of the official Chiretta, and show how it may be distinguished from all other substances. Enumerate its official preparations.

8. What is the botanical source of Kino? How is it obtained, and what are its physical and chemical characters?

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES OF MERIT.

Hours from 10.30 *till* 2.

1. Distinguish between primary meristem, secondary meristem, and permanent tissue.

2. Define the following terms as applied to stems and leaves:—Fasciated, culm, runner, corm, bulb, cataphyllary, obvolute, acuminate, pinnate, pedate.

3. Distinguished between centripetal and centrifugal inflorescences, and define a raceme, panicle, capitulum, cyme.

4. Describe the following fruits:—Achenium, legume, lomentum, capsule, pyxis, pome.

5. What are the official plants of the Rutaceæ? Describe the characters of the different Buchu leaves, and enumerate their official preparations.

6. What are the physical and chemical characters of the official Aconite root, and how may it be known from Horseradish root? Enumerate its official preparations.

7. What are the botanical and geographical sources of the official Ipecacuanha? Describe its physical and chemical characters, enumerate its official preparations, and show how it may be distinguished from all spurious Ipecacuanhas.

SESSION.

SILVER MEDAL AND CERTIFICATES OF HONOUR AND MERIT.

MATERIA MEDICA.

Hours from 2 *till* 5.

1. Describe the physical and chemical characters of Cocculus Indicus, and distinguish between it and Bay Berries.

2. What are the botanical and geographical sources of Asafœtida? Describe its general and chemical characters, and enumerate its official preparations.

3. What are the botanical and geographical sources of Balsam of Peru? How is it obtained, and what are its physical and chemical characters?

4. What is the botanical source of Elaterium? Describe how it may be obtained in the greatest state of purity, its general, chemical, and medicinal properties, the means of ascertaining its purity, and the dose.

5. What are the botanical and geographical sources of the official Rhubarb Root? Describe its general and chemical characters, and enumerate its official preparations.

6. How is Aloes obtained in the greatest state of purity? Describe the botanical and geographical sources of the official kinds of Aloes, and mention their general and chemical characters.

BOTANY.

Hours from 10 *till* 1.3

1. Define the following:—Parenchyma, prosenchyma, sclerenchyma, tracheïdes, collenchyma, fundamental tissue.

2. Define the following:—Hypsophyllary, bracteole, dichasium, verticillaster, corona, isomerous, disk, etærio, pome, pepo.

3. Describe generally the process of fertilization as it occurs in the Angiospermia.

4. Distinguish between assimilation and metastasis.

5. Describe the plant before you in technical language and in the proper sequence of its organs.

6. Give the essential characters of the following natural orders:—Malvaceæ, Cruciferæ, Onagraceæ, Solanaceæ, Scrophulariaceæ, Orchidaceæ.

Report on the Practical Chemistry Class.

Professor Attfield, in reporting on the Practical Chemistry Class, said the number of students during the Session had been 63, 58 being gentlemen and 5 ladies; about half having entered for the junior class, and half for the senior. As regarded the whole class, he had to report as usual that the attendance was good, the diligence satisfactory, the progress fair, while the general conduct of the students was that of quiet, earnest workers. The examination extended over two days, and there was a very good competition. After stating the names which appear below, Professor Attfield said he had one or two remarks to add, not so much with regard to the head work of the students, as to that appertaining to hands and feet. By the kindness of some officers of the Society, opportunities were afforded for the students to engage in that which would enable them to work all the better with their heads afterwards, namely, in football and cricket. He and his colleagues had sometimes been twitted good humouredly with saying too much on behalf of their students, and in reporting that they were always good. It might perhaps be that they had not always reported quite correctly, though he thought they had. They were told that pharmaceutical students were but human, and therefore could not be always good; and this criticism seemed to logically lead to the conclusion that there must be a fallacy somewhere. For himself he would confess that though they had told the truth, and nothing but the truth, about their students, they might not perhaps have told the whole truth, and in reflecting upon his students of the past year for not supporting as they should the cricket and football clubs, he was supplying this deficiency. He did not know how it was; possibly the fifty-eight gentlemen students were so fearful that they would be distanced in the race by the five ladies that they thought they had not a moment to spare for any outdoor recreation; or, possibly, they had such an overdose of organic chemistry from Mr. Dunstan, that they had no time for much physical work. He only reported the fact, because he thought it a pity it was so. Earnest, healthful, bodily work fitted a man all the better to work with his brain. It was a pity also that students of pharmacy did not, while still students, accustom themselves to devote some hours of the day or of the week, at all events, to healthful recreation, because, if they did so, they would not in the future be so liable to fall into those long hours, that so-called counter drudgery, of which many of them he feared became the too willing victims.

The following is a list of the awards of prizes and certificates to students in this class:—

	Session.	Ten Months.
Silver Medal		Ernest John Eastes.
Bronze Medals		Josiah William Steward.
		George Frederic Callaway.
Certificates of Merit	Equal	Robert Wynne
	Equal	Chas. Pierce.
	Equal	Fraser McDiarmid.
		Robert Roberts.
		Edwin Cullinan.

The following are the questions that were set in this examination:

July 17th and 18th, 1884.

(*Books and Memoranda permitted.*)

Standard number of Marks, 100.

FIRST DAY.

Hours 10 *to* 5.

1. Ascertain what salts are present in the "Solution" handed to you.

2. Does the accompanying "Medicine" contain any mineral poison?

SECOND DAY.

Hours 10 *to* 5.

3. What substances are present in the "Powder" supplied to you?

4. How much added water is probably present in the "Milk" placed before you?

5. How much sulphate of zinc is contained in one fluid ounce of the "Lotion?"

P.S.—You are at liberty to select one of the last two exercises but not to attempt both. The same value in marks is attached to a correct answer in either.

Note.—*Manipulation as well as results will be scrutinized.*

The President then presented the prizes and certificates to the successful students, adding a few appropriate words in each case. He then called upon Professor Bentley and Mr. Gale to present the reports with regard to the Herbarium and Council Prizes.

The Herbarium Prize.

Professor Bentley said he had but few observations to make with reference to the Herbarium Prize, for which he regretted to say there had been this year but three competitors. At the same time he was by no means discouraged, looking back to the past, and knowing that on many occasions there had been a very fair competition for this prize. The value of the study of practical botany to apprentices could not be overrated, and he could only hope that in future years it would be more encouraged and kept up. The two gentlemen to whom awards had been made were well worthy of the distinction conferred upon them, and he hoped to see them on some future occasion taking other prizes.

Bronze Medal	Ernest Saville Peck.
Certificate of Merit	Charles Granville Wood.

The Council Examination Prizes.

Mr. Gale, in reporting on the competition for the prizes offered by the Council to students from any school, referred to the fact that the Pereira Medal, which was the blue riband of the Society, was won twenty one years ago by the President. His colleague, Mr. Corder, and he, had to report that this year there were eleven candidates for these prizes, and that the Pereira Medal had been taken for the tenth time by a Bell Scholar.

The prizes were awarded as follows:—

Pereira Medal (silver); and Books value £5, presented by Mr. T. H. Hills.

Fraser McDiarmid.

Pharmaceutical Society's Medal (silver); and Books value £3, presented by Mr. T. H. Hills.

Charles Mann Luxmoore.

Pharmaceutical Society's Medal (bronze); and Books value £2, presented by Mr. T. H. Hills.

John Dolbear.

The following are the questions that were set in this examination:—

BOTANY AND MATERIA MEDICA.

Time: 10 *a.m. to* 1 *p.m.*

In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

BOTANY.

1. Give the characteristics of the Natural Order Graminaceæ: enumerate the plants in it of economic value, giving the countries where they are chiefly cultivated.

2. State the mode of growth, in the cupule of the Oak, the hip in the Dog Rose, the fruit of the Strawberry, and the cone of the Fir.

3. Give the Latin Generic names of the following common English trees:—Ash, Beech, Birch, Hornbeam, Maple, Sycamore, Sloe, Hazel, Willow, Alder, Sallow and Hawthorn.

MATERIA MEDICA.

1. Give the source of Kino, Australian Kino and Eucalyptus Gum, and how would you distinguish them?

2. Give the source and mode of preparation of Chrysophanic Acid, Lactic Acid and Salicylic Acid, both Natural and Artificial.

3. From what source do we obtain Euonymin, Leptandrin, Iridin and Guarana?

CHEMISTRY.

Time: 2 *to* 5 *p.m.*

1. Give a process for the direct conversion of common salt into bicarbonate of soda, and explain how the bye-products can be utilized.

2. Mention the chief properties of Selenium, Tellurium, Boron and Silicon. How are they prepared? Give the formulæ for some of the organic compounds into which these bodies enter.

3. "Dissociation by Heat." "Fractional Distillation." Describe the meaning of these terms and explain by examples.

4. The percentage composition of an organic substance is, Carbon, 39·96; Hydrogen, 6·74; Oxygen (by difference), 53·30. Give the empirical formula.

5. Describe the series of fatty acids and explain the various synthetic processes by which some of them are prepared.

6. Give the tests for the following metals and show how they may be separated from each other:—Cerium, Gold, Palladium, Platinum, Rhodium and Uranium.

The Jacob Bell Memorial Scholarships.

The President, having presented the prizes to the above, said he had next to call upon Mr. Taylor to give his report on the competition for the Jacob Bell Memorial Scholarship, which was founded a great many years ago in honour of one of the Founders and most active supporters of the Society both in Parliament and elsewhere. It was a great pleasure to those who had to carry on the work of the Society to find that their efforts to keep alive the memory of Jacob Bell were so far successful that

almost every Bell Scholar had done honour to them in his after career.

Mr. TAYLOR said, on the part of Dr. Thresh and himself, he regretted to state that the number of candidates for the Jacob Bell Memorial Scholarships had again fallen off, there being this year only twenty, whilst last year there were twenty-five, a number which was so much in advance of those of previous years that a hope was then expressed that the value of this scholarship was becoming more widely recognized. On more than one occasion he had had to express his regret that so few young pharmacists came forward to compete for this prize, but he hoped to see a larger competition in future years. This year there were seven candidates from London, two from Nottingham, and one each from Brighton, Bristol, Canterbury, Exeter, Lincoln, Liverpool, Manchester, Newcastle-on-Tyne, Sheffield, Worcester and York. He might congratulate the successful competitors, and hope they would become distinguished members of the body and reflect credit on the name of the man in whose honour the scholarships were founded.

The names of the successful candidates are—

Robert Potts
and
Edward Ernest Morrall.

The questions that were set for this examination were as follows:—

CHEMISTRY AND PHARMACY AND BOTANY.

Time allowed: *Two hours* (3 *to* 5).

Chemistry and Pharmacy.

1. What is the action of heat upon (*a*) Ammonium Nitrate; (*b*) Potassium Nitrate; and (*c*) Lead Nitrate?
2. How would you distinguish between Distilled Water, Spring Water and Sea Water? What is the rationale of the B.P. process for preparing Aqua Destillata?
3. How many litres of Oxygen (measured at 0° C. and 760 mm. pressure) can be obtained from 1 kilogram of Potassium Chlorate?
4. Describe the process for making the *green* extracts of the B.P.
5. How is Syrupus Ferri Iodidi prepared?

Botany.

1. Describe the inflorescence of the common Daisy.
2. Give briefly the botanical significations of the following terms:—Spore, Seed; Thallus, Frond, Leaf; Gymnosperm and Angiosperm.

Time allowed: *Three hours* (11 *to* 2).

In awarding marks the neatness and legibility of the writing will be taken into account.

LATIN.

1. Translate into English:—

Fit via vi: rumpunt aditus, primosque trucidant
Immissi Danaï, et late loca milite complent.
Non sic, aggeribus ruptis cum spumeus amnis
Exiit, oppositasque evicit gurgite moles,
Fertur in arva furens cumulo, camposque per omnes
Cum stabulis armenta trahit. Vidi ipse furentem
Caede Neoptolemum, geminosque in limine Atridas;
Vidi Hecubam, centumque nurus, Priamumque per aras
Sanguine foedantem, quos ipse sacraverat, ignes.
Quinquaginta illi thalami, spes tanta nepotum.
Barbarico postes auro spoliisque superbi,
Procubuere: tenent Danaï, qua deficit ignis.

2. Give the perfect and supine of *trahit*, *tenent*, *complent*, *deficit*.
3. Parse *vi*, *aggeribus ruptis*, *Atridas*, *spoliis*.
4. What cases are *aditus*, *cumulo*, *nurus*, *nepotum*?
5. How are expressions denoting *at*, *in*, or *on a place*, usually rendered in Latin?
6. State the chief uses (*a*) of the accusative case; (*b*) of the ablative case.

ENGLISH.

1. Write a short essay on Hospitals, or English Exhibitions.
2. Parse the following lines:—

"Perhaps it was right to dissemble your love,
But—why did you kick me downstairs?"

ARITHMETIC.

[The working of these examples, as well as the answers, must be written out in full.]

1. What is the difference between

$$\frac{2\frac{3}{8}+\frac{1}{4}}{7\frac{2}{3}-1\frac{5}{6}} \text{ and } \frac{3\frac{2}{7}+4\frac{2}{5} \text{ of } \frac{2}{33}}{6\frac{2}{3}-1\frac{5}{6} \text{ of } \frac{2}{33}}?$$

2. Find by how much $3+\frac{1}{7+\frac{1}{16}}$ differs from 3·14159.
3. The freezing and boiling points are respectively marked at 0° and 100° in the Centigrade thermometer, and at 32° and 212° in Fahrenheit; find the degree of Fahrenheit which corresponds to 45° Centigrade, and the degree of Centigrade which corresponds to 149° Fahrenheit.

FRENCH OR GERMAN.

The candidate is at liberty to choose either French or German, and is not required to show a knowledge of both. Marks will only be awarded for one.

French.

Translate into English:—

Athènes et Sparte.

"Ce n'est pas dans le premier moment d'une émotion très vive que l'on jouit le plus de ses sentiments. Je m'avançais vers Athènes avec une espèce de plaisir qui m'ôtait le pouvoir de la réflexion; non que j'éprouvasse quelque chose de semblable à ce que j'avais senti à la vue de Lacédémone. Sparte et Athènes ont conservé jusque dans leurs ruines leurs différents caractères: celles de la première sont tristes, graves et solitaires; celles de la seconde sont riantes, légères, habitées. A l'aspect de la patrie de Lycurgue, toutes les pensées deviennent sérieuses, mâles, et profondes; l'âme fortifiée semble s'élever et s'agrandir; devant la ville de Solon, on est comme enchanté par les prestiges du génie; on a l'idée de la perfection de l'homme, considéré comme un être intelligent et immortel. Les hauts sentiments de la nature humaine prenaient à Athènes quelque chose d'élégant qu'ils n'avaient point à Sparte. L'amour de la patrie et de la liberté n'etait point pour les Athéniens un instinct aveugle, mais un sentiment éclairé, fondé sur ce goût du beau dans tous les genres, que le ciel leur avait si libéralement départi: enfin, en passant des ruines de Lacédémone aux ruines d'Athènes, je sentis que j'aurais voulu mourir avec Léonidas, et vivre avec Périclès."—(CHATEAUBRIAND, 'Itinéraire de Paris à Jérusalem.)

German.

Translate into English:—

"Laut und unermesslich war der Iubel, der das befreite Land erfüllte. Aller Augen aber blickten mit Bewunderung, mit Stolz und Liebe, mit freudiger Begeisterung auf den Mann, dem man es vorzüglich verdankte, dass so viel Herrliches vollbracht worden war, und Washington genoss nun die Glückseligkeit, deren ein Mensch fähig ist, wenn er in dem Bewusstsein seiner Rechtschaffenheit sein Streben für das allgemeine Wohl mit dem glücklichsten Erfolge gekrönt sieht. Sein grosses Werk war vollendet und nun zog er sich in die Einsamkeit des Landlebens zurück, nicht ohne vorher herzlichen Antheil an der allgemeinen Freude genommen zu haben. Dann legte er seine Würde feierlich nieder und nahm von seinen Waffengefährten rührenden Abs-

chied. Zuvor erschien jedoch Washington noch im Congresse und hielt hier vor einer unzähligen Menge von Zuhörern seine feierliche Abschiedsrede. Der Präsident des Congresses erwiderte ihm und schloss mit den folgenden Worten: 'Nachdem Sie die Freiheit in dieser neuen Welt vertheidigt haben, treten Sie, von den Segnungen Ihrer Mitbürger begleitet, von dem grossen Schauplatze wieder ab. Aber der Ruhm Ihrer Thaten wird fortdauern und wird die fernsten Geschlechter Ihrer Enkel begeistern!'"—(GRUBE.)

THE INAUGURAL SESSIONAL ADDRESS.

The Inaugural Sessional Address to the Students was then delivered by Mr. W. T. Thiselton Dyer. It will be found at p. 261. At its conclusion—

The PRESIDENT proposed a vote of thanks to Mr. Dyer for the admirable address he had given. He had only to say on the part of the Society that if the authorities of Kew appreciated what the Pharmaceutical Society was able to do for the general advancement of pharmacology and in other ways, they on their part were equally grateful to Kew for sending its Assistant-Director to criticize their work.

The VICE-PRESIDENT seconded the vote of thanks, which was carried unanimously.

Mr. THISELTON DYER briefly acknowledged the compliment, and in so doing begged to express his most hearty sympathy with the work of the Pharmacetical Society.

The meeting was then adjourned till Wednesday, the 5th of November.

Provincial Transactions.

HAWICK PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The first evening meeting of the session of the above Association was held on Friday, September 26, when there was a fair attendance. In the absence of the President, Mr. Dechan was called to the chair.

The minutes of the previous meetings having been read and approved, it was intimated that several new books had been received by purchase and donation. Among the latter was the 'Year-Book of Pharmacy,' for which the Secretary was instructed to express to the Committee of the Pharmaceutical Conference the hearty thanks of the Association.

The Chairman then introduced Mr. W. P. Kennedy, science teacher, who delivered a lecture on "The Eye and Vision."

Commencing with the anatomy of the eye, the lecturer described in detail the structure and functions of the sclerotic coat, cornea, optic nerve, choroid coat, crystalline lens, pupil, iris, and retina. He referred to Helmholtz's discovery of the method by which the eye adjusts itself so as to focus near and distant objects in succession with almost instantaneous rapidity, and gave interesting details regarding the blind spot, the yellow spot, short and long sight, optical illusions and the influence of the imagination in the interpretation of the images on the retina. Quoting Helmholtz's remark as to what he would have thought if any maker had sent him an instrument so full of defects as the eye, Mr. Kennedy showed that what the great German considered defects, were from other points of view really very necessary.

The lecture, which was very comprehensive and most instructive, was illustrated by means of models and diagrams, a number of the latter being shown on the screen by means of the limelight.

Mr. Maben, in proposing a vote of thanks to the lecturer, remarked that the Association was especially fortunate in having secured Mr. Kennedy for the opening meeting of its second session. He was sure it augured well for the year's work, since there was nothing of greater value than a good start. On looking through the syllabus they would find a very fair array of essayists, and the subjects already fixed on gave promise of very interesting meetings. They would have lectures on "Organic Analysis" and "Chemical Mathematics," by two of their science teachers, besides the more elementary, though none the less valuable pharmaceutical papers contributed by themselves. Whilst he was on his feet he took the opportunity of urging all the members of the Association to attend at least two science classes during the forthcoming session. They in Hawick were peculiarly fortunate in having a series of classes under the Science and Art Department, such as he was sure no other town in Great Britain, of the same population, could boast of, and this happy state of affairs was mainly due to the energy of the lecturer of the evening, Mr. Kennedy. Classes would be inaugurated in the following week on inorganic chemistry, organic chemistry, practical chemistry, magnetism and electricity, mathematics, geology, physiography, physiology, and hygiene, besides several technological classes under the City and Guilds of London Institute. Every one of these subjects was of very great importance to pharmaceutical and chemical students, and if the members of that Association failed to take advantage of the opportunities within their reach, they would regret it all their days.

The vote of thanks having been awarded, Mr. Kennedy briefly replied, remarking that Mr. Maben was one of those who took a leading share in the starting of the classes upwards of ten years ago.

After intimation of the arrangements for the session had been made, the proceedings terminated.

Parliamentary and Law Proceedings.

ALLEGED PRESENCE OF LEAD IN LEMONADE AND GINGER BEER.

At the Otley Petty Sessions, on Friday, the 26th ult., an adjourned summons against the Ilkley Brewery Company was heard. About a month since the company was summoned under the Food and Drugs Act for selling to the prejudice of the purchaser lemonade which was not of the nature, substance, and quality demanded; also for selling ginger beer, to which the same objection was urged. At the first hearing a certificate was put in from the county analyst (Mr. Allen, of Sheffield), which set forth that the sample of lemonade sent to him contained an amount of lead something like $1\frac{1}{2}$ grains per imperial gallon, a proportion which was stated to be highly objectionable, and even dangerous, and it was added, that if such liquid were habitually drunk severe and even fatal symptoms of lead poisoning would ensue. For the defence, a certificate of Mr. Rimmington, of Bradford, was put in, which stated that the lead (if any) was very doubtful. Assuming the actual presence of lead, it was in so small a quantity as to be practically inert, and would not exceed one-twentieth part of a grain per gallon. It was therefore suggested and agreed to by the Justices that an analysis should be taken by the authorities at Somerset House, and the case was adjourned pending the result.

That result was now to hand, stating that the sample contained a minute quantity of lead, not exceeding (in the lemonade case) $\frac{1}{55}$ part of 1 grain, and (in the ginger beer case) $\frac{1}{160}$ part of a grain in the sample bottles of 10 ounces; and that the quantity present might be considered to fall within the limits of an accidental impurity.

The solicitor for the defendant denounced in strong terms the certificate issued by the county analyst and applied for costs, but the magistrates deferred a decision on this point until the subject had been considered by the county authorities.

Obituary.

Notice has been received of the death of the following:—

On the 8th of September, Mr. Frederick William Evans, Chemist and Druggist, Treherbert, Glamorganshire. Aged 36 years. Mr. Evans had been a Member of the Pharmaceutical Society since 1880.

On the 10th of September, Mr. Joseph Clarke, Chemist and Druggist, Crumpsall, Cheetham. Age 47 years.

On the 11th of September, Mr. Charles James Williams, Chemist and Druggist, St. John's, Warwick. Age 51 years.

On the 11th of September, Mr. Frederick John Machin, Pharmaceutical Chemist, Hayton Road, Liverpool. Age 42 years. Mr. Machin had been a Member of the Pharmaceutical Society since 1871.

On the 11th of September, at Wimbledon, Mr. Benjamin Cooper, Chemist and Druggist, Docking, Norfolk. Age 56 years.

On the 12th of September, Mr. Frederick Wharton, Chemist and Druggist, Lees Road, Oldham. Age 74 years.

On the 14th of September, Mr. Thomas Sanders, Chemist and Druggist, Abney Park Terrace, Stoke Newington, N. Age 36 years.

On the 28th of September, Mr. Alexander Barnett, Pharmaceutical Chemist, Colonnade, Buxton. Age 41 years. Mr. Barnett became a Member of the Pharmaceutical Society in 1865 and for several years filled the office of Local Secretary.

BOOKS RECEIVED.

THE NATIONAL DISPENSATORY. By ALFRED STILLÉ, M.D., LL.D., and JOHN M. MAISCH, Ph.D. Third Edition. London: J. and A. Churchill, 1884. From the Publishers.

A FEW SUGGESTIONS TO MOTHERS ON THE MANAGEMENT OF THEIR CHILDREN. By a MOTHER. London: J. and A. Churchill, 1884. From the Publishers.

UNIVERSAL PHARMAKOPÖE. Eine vergleichende Zusammenstellung der zur Zeit in Europa und Nordamerika gültigen Pharmakopöen. By Dr. BRUNO HIRSCH. Part I. Leipzig: E. Günther. From the Publisher.

THE NON-BACILLAR NATURE OF ABRUS POISON. By C. J. H. WARDEN, and L. A. WADDELL, M.B. Calcutta: 1884. From the Authors.

THE BUYERS AND SELLERS' GUIDE TO PROFIT ON RETURN. By A. FERGUSON. Eighth Edition. London: Effingham Wilson.

Correspondence.

THE COMPOSITION OF SEIDLITZ POWDERS.

Sir,—As bearing on the paper on "The Composition of Seidlitz Powders" read recently by Mr. Martindale, the following, which has come under my notice in the course of last week, may be interesting to some. Part of the contents of the blue paper of a seidlitz powder—purchased at the shop of a grocer—came into my possession, and a qualitative examination of it led me to desire a more intimate acquaintance with it and so I purchased a complete one. In the blue paper was a coarse powder which contained numerous crystals of a size large enough to be easily seen with the naked eye. There was found in it 21·74 per cent. of sodium bicarbonate and magnesia to correspond to 84·22 per cent. of $MgSO_47H_2O$. (That the figures add up over 100 is caused, I presume, by the previous removal of a part of the water of crystallization of the salts.) The total weight of substance in blue paper was 169·5 grains, hence it contained 36·84 grains of sodium bicarbonate. The white paper powder weighed 13·5 grains and was fairly pure tartaric acid. This would neutralize only 15·18 grains of the bicarbonate and leaves 21·66 free. Some years ago I found in the blue paper of a so-called seidlitz powder only sodium sulphate and bicarbonate—the latter in large excess of the acid in the white paper. Powders such as these must have a very different therapeutical effect from what is often wanted, and their occurrence further indicates the necessity for an official formula for the preparation of seidlitz powders, and this the more particularly since there is such an enormous demand for them—in Scotland at least. I was considerably astonished at Mr. Martindale's experience of the sale of single strength powders, my experience far outrunning even Mr. Kinninmont's, for, I believe, a hundred double strong ones are here sold for each one of single strength. I may add that my double strong powder contains 300 grains sal rochelle, 40 grains sodium bicarbonate in each blue paper, and 40 grains tartaric acid in each white paper, and they satisfy most people who partake of them.

Bellshill, N.B. WILLIAM LAWSON.

PHARMACY IN NEW ZEALAND.

Sir,—Noticing correspondence relative to "Pharmacy and Assistants in New Zealand" in the columns of your Journal and in those of your contemporary, I thought a few remarks from one on the spot might be useful. Pharmacy, like the colony, is still young. There are some three hundred chemists' names on the register of New Zealand, which are considered more than sufficient to supply the present wants of the public. In this city of 20,000 inhabitants, or thereabouts, there are nineteen open chemists and as many medical practitioners, and I am well informed that the other large centres of population are equally well provided with pharmacists. I think you will allow from these figures that New Zealand is not in immediate want of chemists. A Tasmanian correspondent evidently arrived in Otago at a time when the depression was most keenly felt. The class of trade is mostly dispensing for medical men and general retail, little manufacturing amongst the retail chemists. Hours of business 8.30 a.m. to 9 p.m., with more than an English share of Sunday work. Time will not permit of a longer communication for this intermediate mail, but from the above remarks assistants contemplating coming out to New Zealand will be prepared to meet with competition approaching that of home.

Christchurch. C. W. HILL.

PIL. PHOSPHORI, B.P.

Sir,—In your last issue I was rather surprised to see that Mr. Ryley in his letter states that he has never heard any complaints about the indigestibility of pil. phosphori, B.P.

I have heard several, and never use the official formula for phosphorus pills, unless the B.P. pills are specially ordered.

Squire also states in his 'Companion' that "patients complain of these pills passing through the bowels unchanged;" he then gives a very good unofficial formula.

I find the vaseline excipient the best for pil. pot. permang., and for pil. phosph. a formula which I believe was published in the Journal some time ago gives an excellent result, viz., dissolve the phosphorus in chloroform and mass with a mixture of pulv. tragac. co., magnesia and confect. rosæ. Afterwards varnish.

81, *North Street, Ripon.* FREDK. THORNLEY.

Inquirer.—After being deprived of the pericarp. See the B.P. instructions under "Cardamoms," which are very definite.

Taps.—(1) *Geum urbanum.* (2) *Capsella Bursa-pastoris.* (3) *Linum catharticum.* (4) *Erythræa Centaurium.* (5) *Bryonia alba.* (6) *Lavatera arborea.*

H. G. Maddison.—Storm Glass. Cooley gives the following recipe for the solution:—Camphor 2 dr.; nitre 1½ dr.; sal ammoniac, 1 dr.; proof spirit, 2¼ fl. oz.: dissolve.

Hypodermic.—The solution, according to our experience, is cloudy.

A Reader.—There is no such process.

G. E. Goddard.—The salt mentioned is an essential ingredient of the preparation.

Assistant.—The preparation referred to should not be sold by retail except in compliance with the provisions of the Pharmacy Act applying to it, and it may be advisable to decline to supply it at all in some cases.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Langbeck, Schole, Samuel, Waldheim, Vick, W. H. D

MAW'S
EARTHENWARE INHALERS
For Hot Water, Infusions, &c.

ELASTIC TUBE.

Fig. 13.

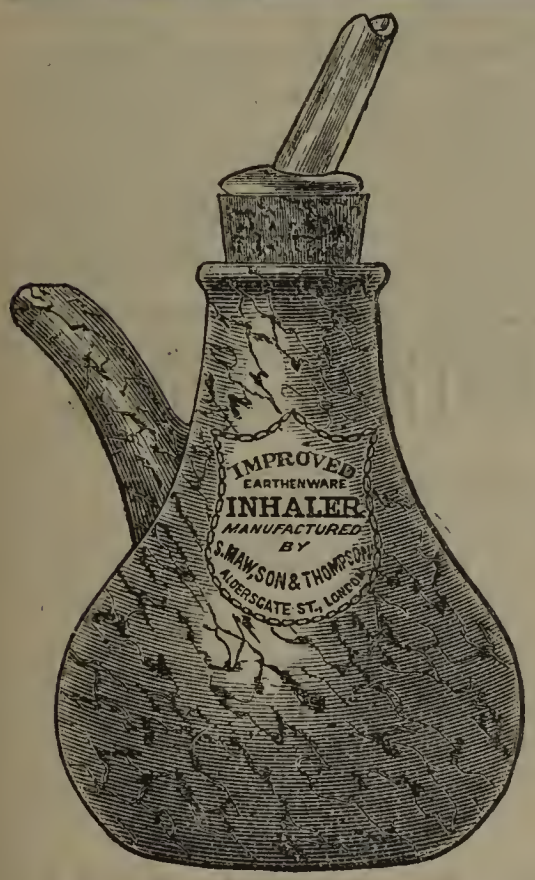

Fig. 8.

MAW'S IMPROVED.

Fig. 100.

MAW'S INVALID.

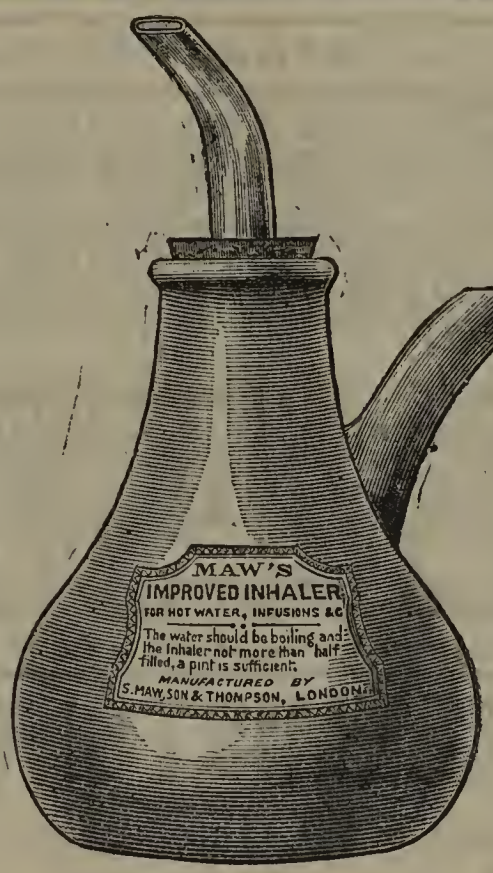

Fig. 8a.

MAW'S IMPROVED.

Fig. 8:—Marbled, 32s. per dozen.

Fig. 100:—White, 33s.; Gilt Lines, 39s. per doz.

This Pattern is specially adapted for use in bed.

Fig. 8a:—White, 21s. per doz.; Retail, 2s. 6d. each.

ELASTIC TUBES, as Fig. 13, will fit any of the above.

7 inches long, including Mouth-pieces ... ... 8s. per dozen.

9 inches long, including Mouth-pieces ... ... 12s. per dozen.

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S. MAW, SON & THOMPSON,
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THESE CASES CONTAIN—

Doz.		*at per doz.*	£	*s.*	*d.*
3	Eno's Fruit Salt, 2/9 size	21/-	3	3	0
1	Do. do. 4/6 „	35/-	1	15	0
6	Pear's Soap, 6d. Tablets (unscented)	3/4	1	0	0
3	Do. do. 1/- „ (scented)	6/8	1	0	0
	(*Or 6 doz. unscented 6d. at buyer's option.*)				
1	Seigel's Syrup, 2/6 size	21/-	1	1	0
1	Jeyes' Perfect Purifier, 2/-, glass bots.	12/6	0	12	6
	(*Or 3 doz. 6d. size at buyer's option.*)				
1	Do. do. 1/- glass bots.	7/-	0	7	0
2	Do. do. 6d. „	4/-	0	8	0
3	Do. do. 3d. „	1/6	0	4	6
1	Do. Sanitary Powder, 1/-, decorated tins	7/-	0	7	0
2	Do. do. 6d. do.	4/-	0	8	0
2	Do. Dog Soap, 6d. tablets ...	2/-	0	4	0
	... ...		£10	10	0

Cases containing half the above quantities, **£5 7s. 6d.**

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BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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INTERMEDIATE TEA, 2s. per lb.
BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

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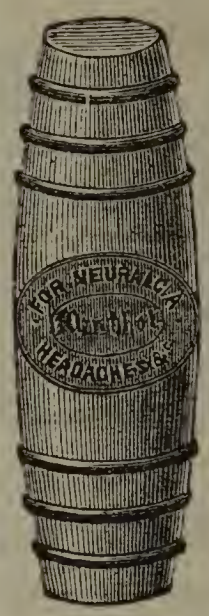
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

PURE MENTHOL CONES.



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The Bottles	5/6	„

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SIR JAMES MURRAY'S
PURE
FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of
ACIDITY, INDIGESTION, HEARTBURN, GRAVEL & GOUT.

Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

His **FLUID CAMPHOR** is a valuable remedy for Sleeplessness and Weak Nerves.
Bottles, 1s. and 2s. each.

Hunyadi János

CAUTION.—Circumstances which have come to the knowledge of Andreas Saxlehner, Buda Pest, Sole Proprietor of the Hunyadi János Spring, compel him to WARN the British Public against SPURIOUS IMITATIONS. To secure genuineness, purchasers should see that every bottle has on the LABEL the name of

"THE APOLLINARIS COMPANY (LIMITED) LONDON."

USE UMNEY'S ALMOND ESSENCE

FREE FROM ALCOHOL
ARTIFICIAL OIL, OR
PRUSSIC ACID.

PURIFIED BY AN IMPROVED PROCESS

1 oz. IN 1 AT 2/6 · ½ oz. 4/6 · ¼ oz. 8/6 · ⅛ oz. 16/6 · 1/16 oz. 32/ BOTTLES EACH SIZE

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PURE AËRATED WATERS.

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SODA WATER.	LEMONADE.
POTASS WATER.	LITHIA WATER.
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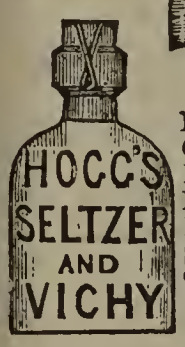

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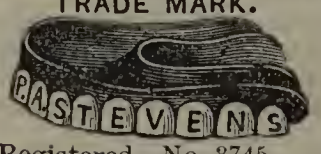

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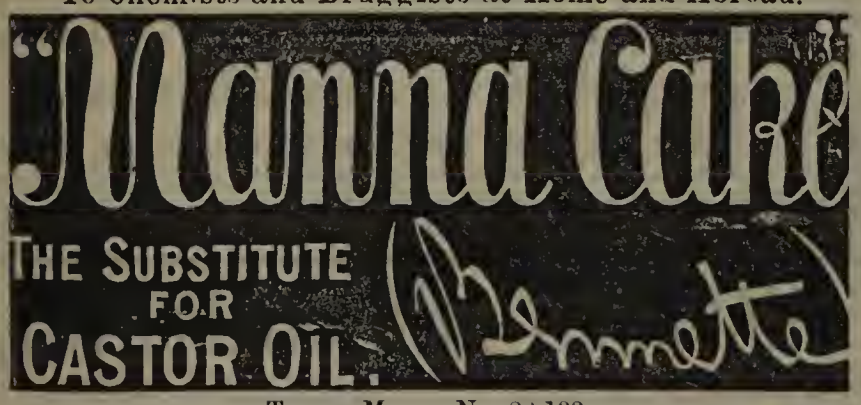

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EDMUND NEEL, *Assistant Military Secretary.*

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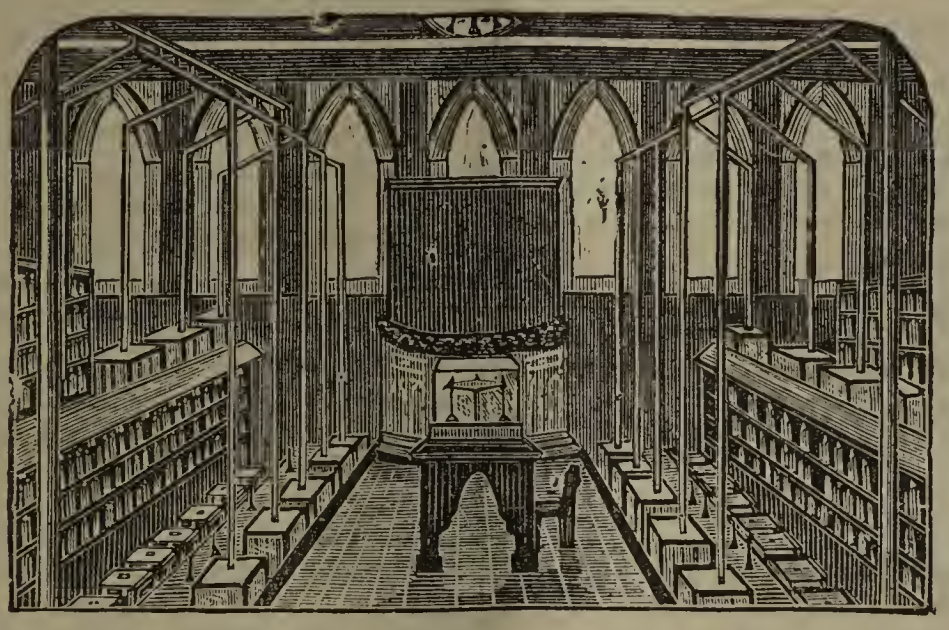

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ALBERT EMBANKMENT, LONDON, S.E.

The WINTER SESSION of 1884-5 commenced on OCTOBER 1st.

TWO ENTRANCE SCIENCE SCHOLARSHIPS of £100 and £60 respectively, open to all first-year Students, will be offered for competition. The Examination will be held on the 6th, 7th and 8th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "PRELIMINARY SCIENTIFIC" and "INTERMEDIATE M.B." Examinations of the UNIVERSITY OF LONDON.

All Hospital Appointments are open to Students without extra charge.

Scholarships and Money Prizes of considerable value are awarded at the Sessional Examinations, as also several Medals.

The Fees may be paid in one sum or by instalments. Entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years; also for Dental Students and for Qualified Practitioners.

Several medical practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Medical Secretary, Mr. George Rendle. W. M. ORD, Dean.

ENGAGEMENTS WANTED.

AS Junior ASSISTANT, by a young man, aged 19, who has served 5 years to the trade. Good references. A. G., Mr. Edwards, Bookseller, Peterborough.

IN a Retail and Dispensing business. Out-door preferred. Age 25. Good Dispensing and Retail experience. ASSISTANT, care of Mr. Lamacraft, 34, High St., Putney.

LOCUM TENENS. Qualified. By the day, week or month. Town or country. CHEMICUS, 51, Judd St., St. Pancras, W.C.

AS ASSISTANT or to Manage Branch. Age 24. Height 5ft. 8in. London and country experience. Disengaged after October 30th. MEDICUS, 92, Tollington Park, London, N.

WHOLESALE.—Wet, Dry Department, or Office. 4½ years' good experience. City firm preferred. Age 20¼. Permanency sought. PHENYL, 23, Victoria Rd., Victoria Park, N.E.

A GERMAN ASSISTANT, who knows English, wishes a position in England or any English Colony where German is wanted. Age 23. RADETZKY, Frankfort-on-Maine, Flora-Apotheke.

DISENGAGED.—As MANAGER or ASSISTANT. Temporary or permanent. Dispenser to Hospital or Surgeon. Registered. Middle-aged. Married. H., 101, Wellesley Rd., Croydon.

LOCUM TENENS or MANAGER, by a Pharmaceutical Chemist, with first-class experience and highest references. BETA, Mr. Burke, William St., Windsor.

AS Junior ASSISTANT. Age 21. Height 5ft. 8in. 3½ years' experience. Country preferred, and where 2 are kept. A. MARTIN, Mr. Curtes, 178, High St., Lewes.

OUT-DOOR ASSISTANT in London. Nearly 4 years' experience. Age 22. Height 5ft. 8in. F., The Castle, Hampstead Heath, N.W.

AS ASSISTANT. Age 24. Height 5ft. 10in. Highest references. Disengaged. CHEMICUS, 9, Trafalgar Sq., Scarborough.

FOR 3 months, in a London Retail, as JUNIOR. Age 21. 5 years' experience. Well up in Dispensing. A., High St., Alcester.

AS JUNIOR, in London, or neighbourhood, by a youth just finished his Apprenticeship. Age 20. Disengaged October 25th. STATIM, Mr. Clarke, 43, King William St., E.C.

ENGAGEMENTS WANTED.

AS Assistant in a Dispensing business. Varied experience. Disengaged. No references given. P. J. N., 16, Air St., W.

PARTIAL Employment. Advertiser is desirous of obtaining a situation as Dispenser to a Surgeon, or as Assistant to a Chemist. Total abstainer. 6 years' reference from last employer. Disengaged daily after 5 p.m. F. W. Watchorn, 43, Kelly St., Kentish Town, N.W.

AS Junior. 5½ years' experience in good light Retail and Dispensing. Good references. Age 21½ years. Lewis Williams, Cook, Chemist, Heyson Green, Nottingham.

AS Assistant. City experience. Fully qualified. Age 24. C. G. C., 24, Holland St., Kensington, W.

AS Dispenser to Surgeon or Public Institution. 8 years' first-class testimonials and experience. Good Prescriber. Age 25. H. Baker, Down Hall, Abington Pigotts, near Royston, Herts.

AS Manager of Branch or out-door Senior. Thoroughly trustworthy. Competent Dispenser and Prescriber. Qualified by exam. London and provincial experience. A permanency desired. A. P. S., Mr. Sunley, 237, Goswell Rd., London.

AS Junior, with half time to attend lectures. Age 22. T. P. S., 140, Hartfield Rd., New Wimbledon.

EVENING employment.—Disengaged after 5 p.m. Minor, 273, Kennington Rd., S.E.

AS Assistant, or could Manage Branch. Good experience and references. Age 22. Permanency, and out-door preferred. J. M. Taylor, Hoyland, Barnsley, Yorks.

AS Junior Assistant in good class Dispensing business, out-doors. 5 years' experience. Salary £60. Age 23. Height 5ft. 11in. F. W., 3, Marine Ter., Walton-on-Naze.

AS Senior or Manager in a good house. Thoroughly competent. Age 30. Qualified. Town and country experience. Associate, 65, Tabley Rd., Tufnell Park, London, N.

AS Junior or Improver, in a good house of business, where 1 or 2 others are kept. W. E. Smith, Lostock Villa, Lostock Hall, near Preston.

AS Junior, in good house, City or West-end. 5 years' experience. First-class references. Disengaged. W. R., 186, Richmond Rd., Hackney.

AS Junior Assistant, in Dispensing business, in country. Good reference. Age 23. Minor, 149, Marylebone Rd., London, N.W.

AS Temporary Manager or Assistant. Thorough experience. Age 30. Abstainer. Or would accept engagement for winter months, whole or part time. Chemicus, 2, Myrtle Cottages, Hoe St., Walthamstow, E.

AS Assistant, with time for study, by Minor student. West-end or N.W. preferred. R. T., 14, Bird St., Oxford St., W.

AS Manager, Active Partner, or Senior, in a good class business. Age 28. Qualified. Disengaged. First-class references and experience. Full particulars to J. H. H., 114, Camberwell Rd., S.E.

WITH view to succession or Partnership. Minor and Hall qualifications. In or out-door. Age 23. Chemicus, Churchill, Osborne Rd., South Shore, Blackpool.

AS Assistant, where 2 are kept. Town preferred. Salary not so much an object as experience. Minor and Hall qualifications. Age 23. Statim, Churchill, Osborne Rd., South Shore, Blackpool.

ASSISTANTS WANTED.

MIDLAND Counties.—At once. A good Junior Assistant. There is also a vacancy for a well educated youth as an Apprentice. Comfortable home and every opportunity for gaining a thorough knowledge of his business. Address, S., care of Messrs. Barron, Harveys & Co., Giltspur St., London.

A COMPETENT Assistant, for a first-class country business (Yorkshire). Not under 23. Short hours. State age, height, salary, and references, enclosing carte, if convenient, to K. O., care of Messrs. Herrings & Co., Aldersgate St., London.

E. WHITTLE, 6, Townshend Rd., St. John's Wood, N.W., requires a competent, trustworthy Assistant, age about 23, accustomed to good class business. A neat and accurate Dispenser, of good address and obliging manners. Must write a good hand. One only kept. No Sunday duty. Apply personally if possible.

A COMPETENT Assistant, with Minor qualification, for November 1st. West-end experience, and well up in Dispensing. About 23. W. Plaister, 13, Gledhow Ter., South Kensington.

AN energetic and obliging Junior, for a Prescribing, Dispensing and Retail business. Time allowed for study if desired. State salary required and full particulars, to T. H. Smithson, 93, Walworth Rd., S.E. Applications not answered in 3 days may be considered declined.

JUNIOR Assistant, for a rough Retail, in the City. T. S., 278, Kennington Park Rd., S.E.

A COMPETENT Junior (in-door), accustomed to a general country business, and of good address. Apply, with references, stating age, height, and salary required, to S. M. Webster, Pharmaceutical Chemist, Bridge St., Warrington.

SOUTH Coast.—A competent Assistant for first-class Dispensing business. Apply, stating when disengaged, age, height, salary, and reference, also enclose carte (to be returned). Z., care of Barron, Harveys & Co., Giltspur St., London, E.C.

WHOLESALE.—Invoice Clerk. Address, stating age, experience, and salary required, Druggist, care of Lee & Nightingale, Advertising Agents, Liverpool.

IMMEDIATELY.—Junior Assistant, of good address, not under 22 years. Well up in Dispensing and Counter Work. Exceptional references required. Apply, personally or by letter, stating age, height, and salary required, to Mr. W. B. Trick, 92, Green Lanes, London, N.

LONDON, W.—Immediately.—A good Junior Assistant for a Dispensing and Retail business. Age about 21. Only one kept. Address, stating full particulars, and enclosing carte (which will be returned), W., Messrs. Meggeson & Co., 14, Miles Lane, Upper Thames St.

IMMEDIATELY.—Nice (South of France). A competent Assistant, to Manage English department. A knowledge of the language not essential. Apply to R. G. Brearley, 122, High St., Bromley, Kent.

AN Assistant, accustomed to good class Retail, Dispensing, and Prescribing. Competent to take sole charge, occasionally. Salary commencing at £50 per annum. Address, with full particulars, J. Westlake, High St., and Hill Ter., Sutton, Surrey.

AN Assistant, with the Minor qualification, for a good class Dispensing business. Address, stating particulars, including age, height, and salary required, with carte if convenient, to Mr. Bullen, 24, Church Rd. West, Brighton, Sussex.

EARLY in November.—A Junior Assistant, accustomed to a country business. Apply, with references and salary required. J. Paget, 9, Church Gate, Loughborough.

ASSISTANTS WANTED.

JUNIOR for a light Retail and Dispensing business. Apply, personally if possible, or send carte, to be returned, to Mr. LAMACRAFT, 34, High St., Putney. Salary £36.

IN 3 weeks.—A Junior ASSISTANT, accustomed to an Agricultural trade. If able to Extract Teeth preferred. Apply, stating age, height, experience, and salary required, to H. C. WEBB, Pharmaceutical Chemist, Buckingham. Carte de visite if convenient; to be returned.

A JUNIOR or IMPROVER. Must have passed Preliminary. First-class references required. HARDWICK, Chemist, Bournemouth.

MESSRS. J. C. and A. THRESH, Buxton, require the services of an ASSISTANT, who must have had good Dispensing experience, and be able to furnish unexceptional references. In-door. One desiring a permanency preferred. Replies to state salary required, and enclose carte de visite, which will be returned.

G. WINDEATT, Wellington, Somerset, requires a Junior ASSISTANT or IMPROVER. Good opportunity for acquiring useful information. State age, height, salary required, and references, enclosing carte de visite, to be returned.

A COMPETENT ASSISTANT for general trade, able to take a responsible position. Good references indispensable. State experience and salary, out-doors. CHEMIST, care of Pickering, Printer, York.

A JUNIOR ASSISTANT, in-door, for the Retail Counter. Apply to WM. FOX & SONS, 109 and 111, Bethnal Green Rd., E.

AN ASSISTANT, in the Laboratory of a Wholesale Druggist, in London. Apply, by letter only, to X., care of W. Charity, 124, Fenchurch St.

ASSISTANT, not under 25 years of age, accustomed to good Retail and Prescribing. A good Tooth Extractor preferred. Salary £50, and commission on Dentistry. E. M., care of Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C.

IMMEDIATELY.—A trustworthy, energetic Junior ASSISTANT, for a good Mixed Retail Drug and Agricultural business, in Cambridgeshire. Hours light. Comfortable home, and time for study. Good reference indispensable. For further particulars, apply personally or by letter, to F. MACREADY, 1, West Ham Lane, Broadway, Stratford, E.

JUNIOR or IMPROVER, for select Retail and Dispensing business, who can Dispense. Must be active, energetic, of good appearance and address. Would suit one from good country business, desiring to perfect himself in Dispensing. Apply, with carte, stating age, height, salary, and references, to Mr. BROWNE, Chemist, Eastbourne, Sussex.

APPRENTICE, also part time Man. Near Wills' College. Time given in each case for attending lectures. Every opportunity for Apprentice learning the business. Home comforts. Good table kept. Moderate premium. Address, O. E., 94, Edward St., Amersham Vale, New Cross, S.E.

A STEADY, active JUNIOR, in a Mixed ready money Retail. In-door. Abstainer preferred. Hours 8 a.m. to 8.30 p.m., except Saturdays, 10.30 p.m. No Sunday duty. State age, height, salary, and all particulars. Character must bear strictest investigation. J. BENNETT, Chemist, Widnes, Lancashire.

AT once.—A JUNIOR, aged about 20, in a good Retail and Prescribing. One seeking a permanency and improvement would find this a rare opportunity. Must have passed Preliminary. Comfortable home. First-class references required. Apply, personally if possible, or by letter, stating salary, &c., to W. M. COVELL, Chemist, 302, Mare St., Hackney, London, E.

ASSISTANTS WANTED.

A COMPETENT ASSISTANT, accustomed to a good class business. Apply, personally, to BUTLER & CRISPE, 4, Cheapside, corner of St. Paul's, London.

IMMEDIATELY.—For first-class Retail and Dispensing, an ASSISTANT, about 24, of good address and having Minor qualification. A vacancy also for good IMPROVER. Apply, first with full particulars, 122, Portland St., Manchester.

MR. COOKE, Church Row, Wandsworth, is in want of an indoor Junior ASSISTANT. Apply, stating salary, age, experience, &c. Sunday duty light.

AN in-door ASSISTANT, for a suburban business, near Crystal Palace. Must be able to Prescribe and Extract Teeth. Two evenings a week for study and recreation. By letter first, to BETA, 14, Miles Lane, E.C.

IMMEDIATELY.—A JUNIOR, IMPROVER, or young Man who has served part of his time. Willing to make himself useful. Used to country trade. Apply, by letter in the first instance, stating salary required and usual particulars, to A. B., care of Messrs. Barclay, 95, Farringdon St.

MORRIS, BANKS & CO., High St., Birmingham, are in immediate want of gentlemanly ASSISTANT (qualified), in-door. One seeking a permanency preferred. Applicants will please state full particulars, with references, and say salary required. Business is competitive. Carte will be returned.

IMMEDIATELY.—A steady and industrious Junior ASSISTANT. Apply to ALFRED COLEMAN, 86, Bute Docks, Cardiff.

SOUTH of France.—In November. A qualified ASSISTANT, neat and accurate Dispenser, and accustomed to good class Retail. Speaking French and acquainted with French Pharmacy preferred. Apply, stating age, height, salary required and references (enclosing photo), PHARMACIE LINDEWALD, Menton, Alpes Maritimes, France.

AN ASSISTANT, about 22 years of age, accustomed to a good Dispensing business. Send full particulars, with carte, or a personal interview, ROBERT KEEVILL, Pharmaceutical Chemist, York Bldgs., Clifton, Bristol.

BY end of October.—Good Dispensing ASSISTANT, accustomed to first-class business. One kept. State age, height, salary, and last situation, carte, if possible, to W. RANSFORD, Chemist, Clevedon.

JUNIOR. Age about 24. Must be good Counterman and neat Dispenser. Apply, or address, CHEMIST, 273, Regent St., W.

LABORATORY.—An experienced man. WYMAN & WESTWOOD, 25, Charles St., Farringdon Rd., E.C.

IMMEDIATELY.—A competent, qualified ASSISTANT, for a permanency, to Manage a Branch, in N.W. district. Must be a good Counterman, Dispenser, &c. Not under 25. Apply, with full particulars, to L., Messrs. Hodgkinson & Co., 198, Upper Whitecross St., E.C. Also, a vacancy for an APPRENTICE.

BUSINESSES FOR DISPOSAL.

GLOUCESTERSHIRE.—A high class Dispensing and Prescribing BUSINESS, with a great many valuable Proprietary Articles. A profitable Aërated Water business combined. All with large profits. Corner shop, with very large house. Best position in the town, and most elaborately fitted up. Rent £160 per year; £30 per year let off to a Dentist for one day in the week, and most of the rent could be realised by sub-letting. Returns £798. No goodwill, and at valuation. Failing health the only reason for selling. Apply to W., care of Messrs. Southall Bros. & Barclay, Birmingham.

BUSINESSES FOR DISPOSAL.

CHEMISTS.—Rare opportunity of acquiring a genuine increasing BUSINESS. First-rate corner position of main thoroughfare. Must be sold at once. In-going, value of fixtures and stock, only about £250. Strongly recommended. CHEMIST, care of Hearon, Squire & Francis, 5, Coleman St., E.C.

FOR £450.—Ready money BUSINESS, in a populous suburb. Good sale of Proprietaries. Large scope for Prescribing. Shop elegantly fitted. Situate in main road. Net profits last year, after paying rent and taxes, £200. Rapidly increasing. N.B.—This business would be a fortune to a steady beginner. CHEMICUS, Housekeeper, 155, Fenchurch St., E.C.

IMMEDIATELY, under circumstances to be explained.—A genuine Dispensing and Family Retail BUSINESS (no heavy trade), in one of the most improving towns in South Devon. In the same hands for 30 years. To a prompt purchaser a great sacrifice would be made. Address, Mr. HUNT, Druggist, Fore St., Exeter.

MESSRS. GURDEN BERDOE have for transfer:—BANKS OF THAMES (overlooking river). Well fitted Retail and Dispensing Trade. Returning £450, by assistant. For £325. EAST COAST. Retail and Prescribing Trade. Returning £650. Good house and garden. Offer wanted. KENT. Handsomely fitted Retail and Prescribing. Returns £800. Full prices. For £675. SOMERSET. Genuine Retail and Prescribing Trade. Returning £450. 11-roomed house. Large garden. Rent £20. For £300. LINCOLNSHIRE. Retail and Prescribing Trade. Returning £1600. Same hands 10 years. For £900. LONDON, W. Retail and Dispensing Trade. Shows £300 net profit. For £500. Also, Pharmacie Français. Returns £1000, net profit £400. For £700, or English Partner taken. S.W. Elegantly fitted corner. Returns £650. For £450. N. Rare chance to beginner. Return £7 weekly. For £220. Others from £100. Apply, 30, Jewry St., Aldgate, City. Sales by auction. Valuations for sale or probate conducted.

20 miles out. Delightfully situated. Retail and Prescribng BUSINESS. Same hands for 30 years. Now retiring. The returns for the past 3 years average £550. Rent £35. Good 8-roomed house. One other Chemist. The population of district is 10,700. Offering rare opportunity of securing genuine old established trade. Price £450. Apply, in first instance, V. S. G., The Shrubbery, Vicarage Rd., Leyton, Essex.

IMMEDIATELY.—In a good town in Hants. A genuine light Retail, Dispensing and Prescribing BUSINESS. Modern fittings, and well stocked. Returns £400. Corner shop and private entrance. Good reasons for disposal. Rent low. Incoming easy. Agents not replied to. Address, F. W., care of Messrs. Edwards & Son, 157, Queen Victoria St., London.

YORKSHIRE.—A ready money Prescribing and general RETAIL. Main thoroughfare in a large manufacturing town. Returns over £500 a year. Good house, and warehouse attached. Rent £35. Vendor having bought a much larger business abroad, reasonable offer entertained. Address, RHEI, care of Messrs. Hirst, Brooke & Hirst, Leeds.

IMMEDIATELY, in consequence of domestic trouble.—The stock, fixtures, household furniture replete, goodwill, &c. Corner shop, beautifully situated. Side entrance. Drug room, small garden, poultry yard, greenhouse, &c. Lease 9 years. Rent £30; let off £13. Semi-detached. Established 12 years. Great bargain. Apply to GILBERT & SON, Grocers, Ainsworth St., Cambridge.

MESSRS. HINE GILBERT have for disposal:—HOME COUNTY. Returning about £1200 yearly. Best position in town. Convenient house. Low rent. This offers an opportunity of acquiring good reliable business on easy terms. MIDLANDS. Returns £1500. Very profitable. Price very low. Apply, personally preferred, to 17, Hart St., Bloomsbury Sq.

BUSINESSES FOR DISPOSAL.

IN Yorkshire.—Owing to retirement. An old-established country BUSINESS. Returns over £900. Incoming £500. First-rate opportunity. For further particulars, and to treat, address, FREDERICK HAIGH, Eagle St., Hanley, Staffordshire.

WANTED TO PURCHASE.

A SOUND BUSINESS, within 50 miles of London. Returns £1000, or more. Strict scrutiny indispensable. Full particulars, in confidence, to Mr. CARLTON, Chemist, Kingston-on-Thames.

A GENTLEMAN, of several years' first-class West-end experience, is prepared to take an active part in a thoroughly good business, with a view of immediate investment of small capital and ultimate purchase. Town or country. Address, with full particulars, M. P. H., 150, Oxford St., W.

TO BE LET.

SHOP, in the busiest part of Nunhead. Rare opening for Chemist. Rent £32. 100, Evelina Rd., Nunhead, S.E.

CAPITAL opening for a Chemist. HOUSE and SHOP, in main road. Rapidly increasing neighbourhood. Rent very moderate. Apply, by letter, X. Y. Z., Bookstall, Beckenham, Kent.

Important to Chemists Fitting Up or Making Alterations.

THE Fittings of a very cheap Shop, comprising 64 second-hand Drawers, painted mahogany, newly labelled and glass knobs, shelving over, with cornice, and return shelving and cornice; 72 pint Rounds, second-hand, 24 half-pint, 24 quart ditto; 12 3lb. white Jars, 12 Pill Jars, 2 Counters, Dispensing Screen, Desk and Glass Case, and 30in. bent front, also Window Enclosure, price £27 11s. 6d. Will be sold in one lot, or separately. Four nearly new 22in. Globe Lamps and handsome Brackets, made to suit customer, £5 each; 1 12ft. nest of 66 superior new pine Drawers, with gold labels and glass knobs, price £6 12s. Particulars on application to R. TOMLINSON, 15, St. Paul's Square, Birmingham.

SPLENDID BARGAIN. 12 PER CENT. SECURED INTEREST.

FOR Disposal, 65 Shares or less number of £1 each fully paid. Address, EXECUTRIX, Messrs. Deacon's, Leadenhall St., London.

TRUSSES.

ABOUT six dozen more or less for sale cheap, to close a bankruptcy. W. J. RICHARDS, Chartered Accountant, Newport, I. W.

POWDER BOX TURNERS WANTED

TO deliver in very large quantities for cash, Bond's Lighthouse Pedestal, with Ink, Pens, and Linen Stretcher. Enquire for samples at Bond's Crystal Palace Marking Ink Works, 75, Southgate Road, London, N.

APARTMENTS.—Advertiser would be glad to meet with comfortable apartments with a Chemist in the western part of London. He is at present engaged in the wholesale trade but would be happy to assist in the shop of an evening. A. P. S., 19, Park Hall Rd., East End, Finchley.

A QUALIFIED Dental Surgeon, in first-class practice, requires a PUPIL. Excellent advantages will be given. Address, in first instance, to L. D. S., Curmew's Library, The Parade, Leamington.

Midland Counties' Transfer Agency.

F. J. BRETT,

Trade Valuer and Auctioneer,

LEICESTER.

VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Purchasers have, at this agency, the advantage of about 300 Businesses to select from, requiring from £100 to £3000 capital.

Probate and Fire Insurance valuations.

DURHAM Co.—Light Retail and PRESCRIBING, with good Specialities, in best position of seaport town, returns £700, price £500.

WARWICKSHIRE.—Dispensing and light RETAIL, with sale of photos of places of local interest, returns now £520, good position, vendor retiring after 40 years' occupancy, will live near and introduce, to a pushing man this is an exceptional opportunity, price £500, or to be arranged.

£1800 returns, in town of 40,000, net profit £750, exceptionally good Specialities, at valuation of goodwill, stock in trade, and fixtures, about £1800.

GLOUCESTERSHIRE.—Dispensing and first-class RETAIL, in fashionable town, returns now £800, can be doubled, at valuation, about £700.

BIRMINGHAM.—Returns £1000, general mixed TRADE, capable of considerable extension, large shop, house, and premises, at valuation, about £700.

LEICESTERSHIRE.—Country RETAIL, unopposed, good house and garden, returns in light retail £400, agricultural trade added would considerably increase returns, price £275, part can remain.

KENT (seaside).—Returns £5 to £6 a week, neglected, price £100.

SHEFFIELD.—Dispensing and light RETAIL, returns £900, fine position, at valuation of stock and fixtures, about £1000.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

VIZER'S

CHEMISTS' TRANSFER and ASSISTANTS' REGISTRATION AGENCY,

Victoria Chambers, 55, Chancery Lane, London.

MR. VIZER has the following businesses, among many others, for sale:—

LANC.—An old established PHARMACY. Returns about £800. Price £750, or by valuation. Another. Returning £620. Price £600.

SURREY.—A commanding position. Returns £600. Price £470. Another. Returns £250. Price £150.

WILTS.—A genuine Family BUSINESS. Price £550. Another. Price £230.

YORKS.—Returns nearly £600. Price £350.

NORFOLK.—A sound Agricultural BUSINESS. Returns £1200. Price £900.

BRISTOL.—A select PHARMACY. Price £400.

LONDON.—Many in various localities.

No charge to purchasers.

ASSISTANTS' REGISTRATION DEPARTMENT.

Employers and Assistants should send full particulars of requirements, with Registration Fee, 2/6, *Postal Order.* Early application is desirable.

Office hours, 10 to 4; Saturdays, 10 to 2.

CHEMISTS' TRANSFERS.

32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business, will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

MESSRS. ORRIDGE & CO. are instructed to transfer :—

1. £900. LONDON, S.E.—Corner shop; good position. Profitable business, nearly £900 yearly. Price about one year's returns.
2. £500. LONDON, N.—Old established. Returns £500. Good class trade. Comfortable house. Price about £500.
3. £700. CANONBURY.—Handsomely fitted shop. Good stock. Returns rather over £700. Price about one year's returns.
4. £1200. LANCASHIRE.—Good class profitable BUSINESS. Returns nearly £1200. Lump sum or valuation terms, at option of purchaser.
5. £600. OXFORDSHIRE (Banks of Thames).—Retail and PRESCRIBING. Beautifully situated. Price about £550.
6. £1200. NORFOLK.—Old established Mixed TRADE. Price about £900. Capital business premises, suitable for small Wholesale.
7. £550. GLOUCESTERSHIRE.—Small country town. Retail and PRESCRIBING. Good situation. Returns £550. Valuation only.

Full particulars furnished on application.

Other businesses, town and country. Particulars free on application.

VALUATIONS.

Terms for valuation on application.

Appointments for October should be made early.

ORRIDGE & CO.

32, Ludgate Hill, E.C.

CAPITAL.—A Chemist, having spare capital, desires to join a qualified young man, possessing some capital, in purchasing or establishing a BUSINESS, on mutual terms. Preference given to one knowing good opening or genuine business for sale. Strict references given and required. Address, PHARMACIST, 33, Market St., Tamworth.

LAMP.

WANTED to purchase a Chemist's, Dentist's, or Doctor's Lamp on a good iron standard, suitable for erection in the street, or a Standard without lamp. Also a small outside Dentist's Show Case, with specimens. Send lowest price and full description to Dr. CHANDLER, 22, Battersea Rise, S.W

No Stable is complete without

ELLIMAN'S ROYAL EMBROCATION

For Sprains of all kinds, Curbs, and Splints.
For Over-reaches, Chapped Heels, Wind Galls.
For Rheumatism in Horses.
For Sore Throats and Influenza.

For Broken Knees, Bruises, Capped Hocks.
For Sore Shoulders, Sore Backs.
For Foot Rot, and Sore Mouths in Sheep and Lambs.

SPECIMEN TESTIMONIALS.

From His Grace the Duke of Rutland, Master of Belvoir Hunt.

December 1st, 1879.

SIRS,—Elliman's Royal Embrocation is used in my stables; I think it very useful.

RUTLAND.

Wolmirstedt, Prussia.

September 20th, 1882.

I am glad to be able to tell you that for the last two years I have regularly used Elliman's Royal Embrocation with very excellent results; especially is it to be recommended for preventing and curing sore backs. I have used it in some cases for sprains of the shoulder with good results. I should also recommend it for applying to the legs of horses after a hard day's work, to give them renewed freshness. KRICHELDORFF,

Riding Master, Estate Owner, and Lieut. of the Reserve of the Altmarkischen Ulanen Regiment, Nr. 16.

From Col. Pryse, Peithyll, Aberystwith.

April 1st, 1884.

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C. PRYSE, *Master of Colonel Pryse's Hounds.*

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December, 1878.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 746.] SATURDAY, OCTOBER 11, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
A New Form of Apparatus for Continuous Percolation with Boiling Fluids. By J. C. Thresh, D.Sc.	281
An Improved Method of Preparing Ointment of Salicylic Acid. By Balmanno Squire, M.B.	281
Note on Sesame Oil. By F. H. Alcock	282
Absolute Ether. By Dr. Squibb	282
Eulachon Oil—A Substitute for Cod Liver Oil. By A. B. Lyons, M.D.	287
Relation of Plants to Hygiene. By J. M. Anders, Ph.D.	288
The Uncertain Composition and Action of Grey Powder. By G. Johnson, M.D.	290
EDITORIAL ARTICLES AND NOTES:—	
Pharmacopœia Revision	291
Notes: Queensland Pharmacy Bill—Strychnine Pill Poisoning Case—Poisonous Pigments—The Eucalyptus and Malaria—Indian Statistics	292
PROVINCIAL TRANSACTIONS:—	
Liverpool Chemists' Association	293
THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE:—	
Presidential Address to the Chemical Section. By Sir H. E. Roscoe	294
AMERICAN PHARMACEUTICAL ASSOCIATION:—	
Hydrastine. By F. B. Power	297
PARLIAMENTARY AND LAW PROCEEDINGS:—	
The Sale of Arsenic	300
CORRESPONDENCE:—	
Permanganate of Potash Pills	300
Answers to Correspondents	300

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 5th, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at half-past 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 29th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held.

NORTH BRITISH BRANCH.

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The Society's Rooms at 119A, George Street, Edinburgh, are closed. All communications should be sent to the new premises, 36, York Place, Edinburgh, which will be opened on Tuesday, October 14th.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 5th day of December next, at 12 o'clock precisely.

By order of the Council,

RICHARD BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 1st, 1884.

There are at present *thirty-nine* annuitants, receiving £1320 per annum, and casual relief is also granted, amounting to nearly £700 per annum, involving a total annual expenditure of upwards of £2000.

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OF THE

Pharmaceutical Society of Great Britain.

FORTY-THIRD SESSION, 1884—85.

This Session commenced on Wednesday, October 1st, 1884, as follows:—

CHEMISTRY AND PHARMACY..... Professor REDWOOD and Mr. DUNSTAN.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
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The class in Practical Dispensing and the Reading of Prescriptions is conducted by Mr. Joseph Ince, and meets twice a week at 5 p.m.

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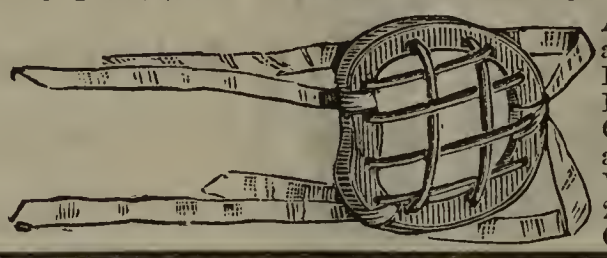

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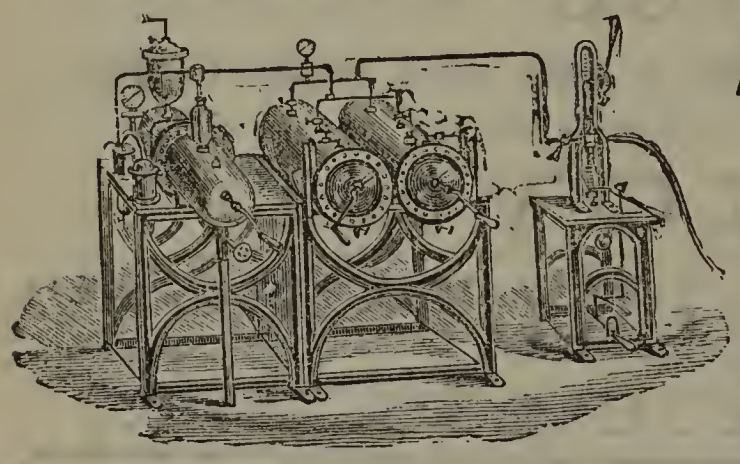

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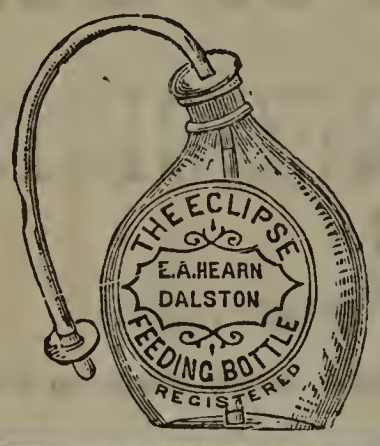

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So combined, the oil is subdivided into minute particles, which can be seen under the microscope to be as fine as the granules of milk, and much finer than any that can be obtained by any emulsion with gums. On the fineness of the emulsion depends the digestibility of the oil. "The digestive change undergone by fatty matters in the small intestine consists mainly in their reduction into a state of emulsion, or division into infinitely minute particles."

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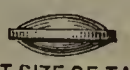

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The following formulæ and combinations embrace all those in general request. Others will be added as the demands of the profession warrant.

We claim for the Wyeth Hypodermic Tablets:

Absolute Accuracy of Dose.
Ready and Entire Solubility.
Perfect Preservation of the Drug.

Their convenience and utility will at once be apparent on examination.

Morphiæ Sulphas ....1-3 grain.	Morphiæ Sulphas ....1-8 grain.
Morphiæ Sulphas ....1-4 grain.	Atropiæ Sulphas ... 1-200 grain.
Morphiæ Sulphas ....1-6 grain.	Morphiæ Sulphas ....1-12 grain.
Morphiæ Sulphas ....1-8 grain.	Atropiæ Sulphas ....1-250 grain.
Morphiæ Sulphas ....1-12 grain.	Atropiæ Sulphas ....1-60 grain.
Morphiæ Sulphas ....1-3 grain.	Atropiæ Sulphas ....1-100 grain.
Atropiæ Sulphas ....1-120 grain.	Atropiæ Sulphas ....1-150 grain.
Morphiæ Sulphas ....1-4 grain.	Strychniæ Sulphas ..1-60 grain.
Atropiæ Sulphas ....1-150 grain.	Strychniæ Sulphas ..1-100 grain.
Morphiæ Sulphas ....1-6 grain.	Strychniæ Sulphas ..1-150 grain.
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1. It is easily administered, the dose being very small.
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5. It does not blacken the teeth.

In ordering please specify Fer. Wyeth 3 oz. with Dropper.

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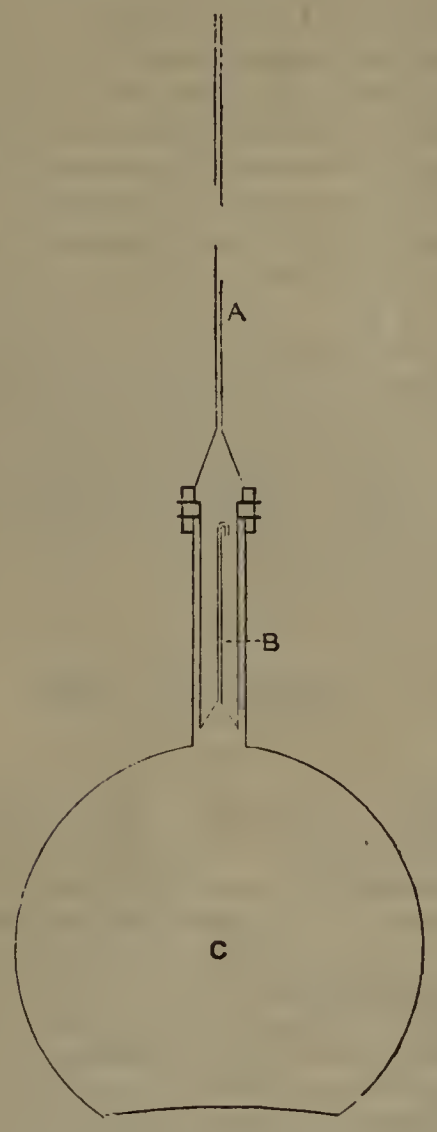
A NEW FORM OF APPARATUS FOR CONTINUOUS PERCOLATION WITH BOILING FLUIDS.

BY J. C. THRESH, D.SC.

The little apparatus figured and described below was devised for use in the proximate analysis of drugs, to effect exhaustion with boiling ether or petroleum spirit. It has answered this purpose admirably, and has also proved exceedingly convenient in extracting the fat from milk residues, and doubtless would be of service in many similar estimations.

The apparatus consists of three parts, *A*, the long condensing tube; *B*, the percolator; and *C*, the flask to contain the solvent.

C. The flask, which may be of any desired capacity, has a long neck and thickened lip, ground flat on the upper surface.



B. The percolator is a cylindrical tube, a little shorter than the neck of the flask, and in diameter one-eighth to one-fourth of an inch smaller than the latter. The mouth of the tube bears a thickened flange, ground on both its upper and lower surfaces. The bottom of the tube is puntied and perforated, and drawn out at the centre into a fine tube, curved at the apex, and nearly as long as the percolator.

A. The condenser is simply a long glass tube with conical funnel-shaped mouth and thickened rim, ground on the upper surface.

A little cotton wool being placed in the bottom of the percolator, the substance to be exhausted is introduced and packed. Upon this is laid a little wool (or disk of filter paper) and finally a thin ring of cork fitting the tube somewhat tightly. A sufficient quantity of menstruum being placed in the flask a thin ring of cork is pushed down over the percolator, and the latter fitted in the neck of the flask. Another cork disk is laid upon the mouth of the tube and the funnel of the condenser applied to it and the whole secured together by a little string or wire.

The action of the apparatus is obvious. With very volatile liquids it is advisable to pass the tube *A* through a wider tube, through which a current of cold water is constantly passing. In my hands, fitted as above described, it has proved more convenient and satisfactory than any other form of apparatus for this purpose which I have tried.

AN IMPROVED METHOD OF PREPARING OINTMENT OF SALICYLIC ACID.

BY BALMANNO SQUIRE, M.B.,

Surgeon to the British Hospital for Diseases of the Skin.

Salicylic acid ointment is now largely used, not only as a dressing to surgical wounds in the "*antiseptic*" or "*Lister*" treatment of them, but also as a local remedy in one of the commonest of the diseases of the skin, namely in eczema. Any improvement in its mode of manufacture may therefore prove a general advantage.

I find that salicylic acid is soluble in hot lard (at water-bath temperature) in about the proportion in which it is usually prescribed, that is to say at the rate of thirty grains of the acid to an ounce of lard. I mention this fact because I have before ventured in this Journal to suggest to pharmacists a systematic investigation on their part of the solubility of ointment remedies in hot lard, and on this ground, namely, that I find as a matter of my own experience that a remedy which has undergone *solution* in the lard that it is prescribed with is much more vigorous in its action on the skin or on a wound than when it has been merely *mixed* with cold lard; the ointment becomes also of better appearance, although that is a minor matter.

In the case of chrysophanic ointment, I suggested that after its preparation by solution of the acid in hot lard the ointment should, after cooling, be well mixed with the pestle and mortar on account of the tendency of the particles of the acid (minutely precipitated during the cooling of the ointment) to collect towards the surface, more especially at the edges of the surface.

I observe that the same phenomenon occurs during the cooling of salicylic ointment that I have noted in the case of chrysophanic ointment, so that the pestle and mortar are here also necessary to finish the manufacture of the ointment by the solution method.

In the treatment of any disease of the skin, the minutest possible division of any remedy employed in the state of ointment is an advantage which will promptly disclose itself to any one who may choose to experiment on the question; but in the matter of antiseptic applications to wounds, where the aim is to exclude by means of a specially composed ointment the access of infinitesimal germs, such an advantage must perhaps be of still higher value. I have never been able thoroughly to understand why the British Pharmacopœia orders the crystals of sublimed sulphur to be used for the manufacture of sulphur ointment, in place of the much more minutely divided dust of precipitated

sulphur. The former would indeed present to the eye of the acarus scabiei (but for the fact that he is destitute of eyes) the appearance of huge rocks of sulphur submerged in a sea of grease, in place of the comparatively muddy appearance of an ointment of precipitated sulphur.

It is true that in former days "precipitated sulphur" used to be largely composed of sulphate of lime, but those days are long since past and the article is now almost universally vended in a pure condition.

One of the best illustrations of my point is afforded by the assistance of the *yellow* oxide of mercury, which in other words is the precipitated as opposed to the coarse or crystalline or so called *red* oxide of mercury.

In pursuance of my preference for the minutely divided conditions of drugs, when used as ointments, I advocated, many years ago, the substitution of the precipitated or yellow oxide for the red oxide in the manufacture of oxide of mercury ointment, not only for cutaneous, but for ophthalmic use, and I read a paper on the subject before the Pharmaceutical Society, on March 8, 1865. The communication, as I admit, attracted no notice whatever in this country, but was copied a month or so afterwards into various French and German periodicals, in which I read an account of it. There equally it attracted no attention except on the part of an oculist, Professor Pagenstecher, of Wiesbaden, lately deceased. He made trial of it and struck with its advantages warmly advocated it, so that about nine months after the reading of my paper the ointment reappeared in this country as Pagenstecher's ointment, under which name it is still known and commonly employed by ophthalmic surgeons.

Mr. White Cooper, in the course of some experiments as to its effect on the diseased conjunctiva, which of course affords a more delicate test of an ointment than almost any condition of the more callous skin, found that in any given case only a much *weaker* ointment of the *precipitated* than of the crystalline (red) oxide could be tolerated. The merit of appreciating this difference so cordially as to enforce incisively a general adoption of the improvement is beyond question due to Professor Pagenstecher, whose energetic habits indeed were the cause of his death; but it is almost to be wished for, that in the compilation of a work which is so comprehensive, and which necessarily exerts so great an influence on the therapeutics of the day, as the national Pharmacopœia, some larger constituency than two pharmacists supervised by five general physicians should be consulted.

Ointments, although an important item in a pharmacopœia, are in their details somewhat on the outskirts of general medicine; Pagenstecher's ointment, at the least, is not to be found in the British Pharmacopœia. It is used all over the world, but in the Pharmacopœia the red oxide ointment figured still as before nine years after the yellow had come into general preference and stands still so fifteen years after. Some advantage for the future certainly might be gained by the help of those who by cultivating limited departments of medicine have acquired something of a larger acquaintance than is perhaps common of particular classes of remedies; but even waiving that, the absolute exclusion of surgeons, and one may even add of obstetric practitioners, from the legislative parliament of authors of the Pharmacopœia is really quite an anomaly in the present day, as if surgeons were now-a-days armed only with knives, or obstetricians only with forceps and binders. What, it may be asked, do physicians know (officially) of the antiseptic surgical method, or of diseases of the eye, or of stone in the bladder, or of the remedies external or internal for lesions of the ear? At the risk of censure, I will imagine that their knowledge is not quite thorough; but yet the Pharmacopœia is understood on every side to be the most profound attainable exposition of all remedies that can be employed in the relief of bodily distress of any kind.

NOTE ON SESAME OIL.

BY F. H. ALCOCK.

Some time ago I was asked for a formula for a Linimentum ammoniæ, such as B.P., but using an oil which when properly mixed with the ammonia would not afterwards separate or become too thick. Many oils in different proportions were tried but, after standing for periods varying from three days to three months, all separated except that made with sesame oil. Great care was taken to have the Liq. ammoniæ of B.P. strength and gravity, and quantities for the liniment in B.P. proportions accurately measured. The resulting liniment is a highly satisfactory preparation, for even after standing three months there is no sign of separation, and it presents a beautiful creamy consistence and colour which have altered but very slightly since the time it was first prepared.

ABSOLUTE ETHER.*

BY DR. SQUIBB.

The strength of ether, like that of alcohol, is almost entirely judged of, or determined by specific gravity. The other constants of the liquids are the boiling points, but both are so liable to present the appearance of boiling at temperatures both above and below their true boiling points that this constant is not a trustworthy indication of strength for either liquid in practice. Besides, the boiling points present smaller differences than the densities, and are far more difficult to take with accuracy.

The authorities on the subject of ether which is entirely pure, or free from alcohol and water, are nearly as discordant, and as confused as in the case of alcohol, and the differences as great, and therefore the writer's long experience with the substance and his good opportunities for research, have induced him to investigate the substance.

While the admixture of alcohol with water is attended with a rise of temperature which varies with the proportions of the two liquids and gives a varying contraction, thus giving a curve in the line of expansion, and an irregular coefficient,—ether when mixed with alcohol is marked by a fall of temperature and gives a larger coefficient of expansion, which is more uniform. It thus becomes easier to compare the statements of the different authorities in regard to ether, by reducing them to a common temperature.

The following are a few of the prominent authorities upon the density of absolute ether:—

* From *Ephemeris*, July, 1884.

Dumas and Boullay . .	·713 at 20° C.
Saussure and Thénard .	·7155 at 20° C.
Gay-Lussac	·7119 at 25° C.
Richter	·706 to ·710 at 20° C.
Boullay	·690. No temp. given.
Kopp	·73658 at 0° C.

These are the six authorities of eleven quoted in Gmelin's 'Handbook,' Cavendish Society edition, vol. viii., p. 175, which give the lowest specific gravities.

Kopp is quoted in 'Constants of Nature,' Smithsonian Institution, as giving ·73568 at 0° C., but it is doubtful if this be not an accidental transposition of a figure in copying, Gmelin having the more correct reading for the same specific gravity, namely, ·73658.

The 'Dictionaries' of both Watts and Wurtz give ·723 at 12·5° C., the second authority giving this as having been the determination of Gay-Lussac.

Mendelejeff, quoted at second hand, gives ·73644 at 0° C.

The two most recent authorities are Allen, 'Commercial Organic Analysis,' 1879, vol. i., p. 134, who gives "0·713 at 15° C., or 0·7185 at 17·5° C.;" and Roscoe and Schorlemmer, 'Treatise on Chemistry,' 1882, vol. iii., Part I., p. 333, "at 0° it possesses a specific gravity of 0·73568, and at 15° of 0·70240."

Each of these more recent authorities gives a pair of specific gravities, and each has a serious error which is apparent to even casual inspection to such as are familiar with the subject, but which is very confusing to those who are not, and who use the authorities for trustworthy reference.

Allen gives his higher specific gravity for his higher temperature, which of course is exactly wrong, since the density diminishes by expansion through increase of temperature. Neither of his specific gravities agree with other authorities, and yet he could not have taken both himself,—at least, not from the same ether.

Roscoe and Schorlemmer quote Kopp and Andrews for the boiling point figures in the sentence preceding that for specific gravity, but give the specific gravities, by inference, as being their own. The specific gravity at 0°, however, namely, 0·73568, is the one occasionally quoted as that of Kopp, wherein a figure is supposed by this writer to have got transposed, since Gmelin and others quote Kopp as ·73658 at 0°. The second specific gravity is, however, wholly incompatible with either of these, since ·73568 at 0° is about equivalent to ·71888 at 15°, while ·73658 is equivalent to ·71978, both seriously at variance with "0·70240."

The writer's determinations for absolute ether, as given further on, are ·73128 at 4° C., and ·71888 at 15° C.,—difference for 11° C., ·01240; or for 1° C., ·00127+. Adopting then the quantity ·00127 as the coefficient of expansion for 1° C., and by it bringing all the authorities above quoted to the uniform temperature of 15° C., they stand very nearly as follows:—

Dumas and Boullay's, ·713 at 20° is equivalent to ·71935 at 15°.

Saussure and Thénard, ·7155 at 20° is equivalent to ·72185 at 15°.

Gay-Lussac, ·7119 at 25° is equivalent to ·72460 at 15°.

Richter, ·706 to ·710 at 20° too indefinite for computation, but mentioned because much lower than any other authority met with, with the possible exception of Boullay, who is quoted by Gmelin ·690, but without any temperature given.

Kopp, as quoted by Gmelin, ·73658 at 0° is equivalent to ·71753 at 15°.

Kopp, as quoted by others, ·73568 at 0° is equivalent to ·71663 at 15°.

Watts and Wurtz, ·723 at 12·5° is equivalent to ·71982 at 15°.

Mendelejeff, ·73644 at 0° is equivalent to ·71739 at 15°.

Allen, ·7185 at 17·5° is equivalent to ·71532 at 15°.

Allen, ·713 at 15° is equivalent to ·713 at 15°.

Roscoe and Schorlemmer, ·73568 at 0° is equivalent to ·71663 at 15°.

Roscoe and Schorlemmer, ·70240 at 15° is equivalent to ·70240 at 15°.

The writer's determination, ·73128 at 4° is equivalent to ·71888 at 15°.

The chief difficulties in regard to absolute ether are first, to get it free from alcohol, air and water, and next, to take the specific gravity of so volatile a liquid which is so exceedingly sensitive to changes of temperature, with accuracy; and therefore the above discrepancies indicate the means at the disposal of the observers, and the skill and accuracy with which they were applied; and from this consideration it is highly probable that the results of Mendelejeff are the most trustworthy for the present time. With the return of cold weather the writer hopes to resume his investigations, and it is possible then that his own conclusions may be better supported.

The work of all the earlier authorities on absolute ether was rendered very difficult and uncertain for want of indicators of the presence of minute quantities of alcohol and water, so that much of the ether was supposed to be free from these, when in reality it was not so; and although much better indicators are now known and easily applied, it is still doubtful whether these are absolute in their indications, so that all that can be fairly claimed is an important progress toward the desired completeness of result.

The rapidly increasing importance of ether, not only as an anæsthetic in medicine, but as a discriminating general solvent in the arts and sciences, makes it of increasing importance that its properties should be more certainly and more accurately known, and in this interest the present paper is offered, in the hope that the writer's long experience and excellent opportunities with the substance may enable him to throw some new light upon the subject of its strength and purity, and the means by which those may be definitely ascertained.

In the *American Journal of Pharmacy* for September, 1856, vol. xxviii., p. 385, the writer published an article, entitled "Apparatus for the Preparation of Ether by Steam." This was the result of an experience of about three years with various apparatus which led up to this one, and the design there given, with modifications of detail and increase in size and capacity, has now been in constant use for over thirty years, yielding a uniform ether of excellent quality in large quantities. The writer believes that he was the first to use steam heat for the manufacture of ether, or, at least, the first to publish the fact that the steam from ordinary steam boilers, carrying forty to sixty pounds pressure to the square inch, could be easily utilized for the etherification of alcohol, thereby rendering the process far more safe, easier, more convenient and more economical, and at the same time yielding ether of much better quality.

The modifications of this apparatus, now in successful use, vary very little in design, and not at all in the principles involved from the original as published, although very much larger. The same general form of still and internal steam coil of heavy lead, is followed by a cast iron purifier, the larger lower chamber of which contains a solution of potassa renewed every day. This chamber has a wire gauze diaphragm, always immersed in the solution, to divide the bubbles of vapour, and has a steam coil to keep the solution heated above the boiling point of alcohol, so that the vapours of ether, and of alcohol which has escaped etherification, are finely divided and thoroughly washed in the alkaline solution. Surmounting this chamber are five smaller plunger chambers of the same form and arrangement as the chambers of an alcohol column. In these the mixed vapours, still kept above their condensing points, are washed five times in succession by a descending current of hot distilled water coming from above. Escaping from this series of wash-

ings, the vapours, now consisting chiefly of alcohol and ether, and uncondensable gases, enter a second purifier. This consists of a large block-tin worm which terminates in a central cylinder furnished with wire gauze diaphragms, upon which rest about two inches of round pebble stones. From the bottom of this cylinder a small block-tin tube leads the liquid condensed by it to a small, cold, condensing worm from which the liquid is conducted to the feed-back of the still, where it is received into the fresh supply of alcohol for the still. At the top the cylinder communicates with the large block-tin condensing worm for the purified ether. The block-tin worm and central cylinder which constitute this second purifier, are placed within a large sheet iron tank supplied with water at a temperature of 35° C. or 95° F., kept at a constant temperature throughout, by means of a long upright shaft supplied throughout its length with propeller blades. This shaft is kept in motion by the power of the current of water which supplies the final large condensing worm.

The still is first charged with about 13 gallons of alcohol or clean spirit, and into this about two carboys, or 360 lbs. of concentrated sulphuric acid, is run slowly in a small stream. The still is then closed and heated to the etherifying point of about 130° C. or 266° F., the purifiers being charged and heated up at the same time. The temperatures of the various parts being now kept steady the apparatus is nearly automatic. After a portion of ether has been distilled off from the commencing charge, and the temperature of the contents of the still begins to rise, the supply of fresh alcohol from the feed-back is turned into the still, and so regulated as to keep the mixture nearly at a constant quantity and temperature. The vapours are washed in the first purifier, and then the second purifier, being kept at such a temperature as not to condense the pure ether and the proportion of alcohol which must go with it by the laws which govern the tension of the mixed vapours,—separates all the separable alcohol and other vapours of higher boiling points than ether, and draining these off from the enormously multiplied surfaces of the pebble stones, delivers them into the feed-back to be again subjected to the action of the acid in the still. Thus the separable alcohol which has escaped etherification is returned to the still with the fresh alcohol, until all is etherified; and the purified ether vapour, with its 4 to 4·2 per cent. of inseparable alcohol, passes over to the final condensing worm, and thence, condensed and cooled, into the storage reservoir. The present apparatus is of such a capacity as to etherify about one barrel of clean spirit each working day of nine and a half hours, and, with the exception of two to three months of summer, when even the well water is not cold enough to give an economical condensation, it is run from year to year. If the spirit or alcohol be of good quality and clean, the sulphuric acid does not require changing oftener than once in each running, and then only because it gets so dark and tarry by the charring of the impurities of the alcohol as to render the mixture in the still liable to frothing. The one charge of acid will generally etherify, without much inconvenience, about one hundred and twenty barrels of clean spirit, when it becomes economical to throw it away and put in a fresh charge. In splitting the alcohol into ether and water, both distil over, leaving the acid unchanged, except by accidental foreign matters in the spirit—the water accumulating in the lower chamber of the first purifier, to be run off with the solution of potassa at the end of each day. Nothing could be more effective or convenient than this apparatus, either in facility of management or quality of the product, and nothing short of the grossest carelessness or inattention can interfere with the uniformity of the product. First, with the personal attention of the writer, and, afterwards, by the services of a succession of intelligent and capable men, it has passed through six different generations or renewals within thirty odd years, without a single serious accident, and always yielding a satisfactory product in the writer's experience. The apparatus has been copied, by the writer's consent, by four other manufacturers, but without yielding results so satisfactory in quality of product. But in two instances, where it was made for others by the writer's own mechanics, lent for the purpose, the defective quality of product could be traced to the omission of the second purifier, or the substitution of some less expensive and less effective form of this important part.

The apparatus could easily be run night and day, by a double set of hands, if lighted from outside the building, but it is not the least of its merits that it can be stopped over nights and Sundays without serious loss or disadvantage. For the entire process, including the putting up of the product, three good men are required, exclusive of the labelling and wrapping, and of course all who are employed about so volatile and so inflammable a substance must be of a class that renders the services expensive, while the plant itself is an expensive one.

The quantity of alcohol and spirit etherified by the writer with this apparatus now amounts to many thousand barrels, and the strength of the alcohol has perhaps averaged about 91 per cent. The possible theoretical yield of absolute ether from alcohol of this strength is about 4·85 pounds to the gallon, but this apparatus, upon an average of large quantities does not yield over 4 pounds to the gallon. That is, the available product, put up, is about 4·1 pounds of ether of a strength of 95 to 96 per cent. to the gallon. But all packages are put up about 4 per cent. over weight, and there is some loss in bottling and by breakage. So that the net yield of the stronger ether is about 4·26 pounds to the gallon—4·1 pounds, or thereabouts, being realized. This ether, as produced for a long time past, has a specific gravity which varies very slightly from the following figures:—

Weighed at 4° C.=39·2 F. comp. with water at 4° C.=39·2° F. as unity, ·73662;
Weighed at 15° C.=59° F. comp. with water at 4° C.=39·2° F. as unity, ·72450;
Weighed at 15·6° C.=60° F. comp. with water at 4° C.=39·2 F. as unity, ·72384;
Weighed at 25° C.=77° F. comp. with water at 4° C.=39·2° F. as unity, ·71354;
all the specific gravities being apparent or uncorrected.

The ether is quite clean and practically free from everything except alcohol and water. Of this ether about 8 litres was taken and shaken twice in a shaking machine, with its own volume of distilled water, for about two hours. The separated ether was then again shaken three times in the machine with about one-third its volume of water. By this management about one-third of the ether was washed away, and probably very nearly all the alcohol was washed out of the remainder, leaving this fully saturated with water. The washed ether was put into two bottles, and to each was added about half a pound of fused chloride of calcium which had been first ground to powder and then reheated to a point just short of fusion. The bottles were then shaken three times for about fifteen minutes at intervals of a hour, and allowed to stand a week with occasional hand agitation, and were then shaken again by the machine as before. This week of digestion and shaking was repeated a third time, after which the clear supernatant ether was aspirated into a distillating apparatus under absolute alcohol. From this it was distilled under a partial vacuum of about fifteen inches, by the application of a water-bath with water just warm enough to counteract the cold produced by the rapid evaporation or boiling of the ether. The distillate was received in six fractions. The first and last of these were small fractions, and were not weighed. The four other fractions, of about 750 c.c. each, were very carefully weighed in the flask with the following results, water at 4° C. being taken as unity:—

First fraction weighed at 4° C., ·73128, uncorrected or apparent.

First fraction weighed at 15° C., ·71908, uncorrected or apparent.

First fraction weighed at 15·6° C., ·71838, uncorrected or apparent.

First fraction weighed at 25° C., ·70788, uncorrected or apparent.

First fraction compared with water at 15·6° C. = 60° F., as unity.

First fraction weighed at 15·6° C., ·71890, apparent or uncorrected.

First fraction weighed at 25° C., ·70842, apparent or uncorrected

Second fraction, water at 4° C., being taken as unity.

Second fraction weighed at 15° C, ·71912, apparent or uncorrected.

Third fraction weighed at 15° C., ·71916, apparent or uncorrected.

Fourth fraction weighed at 15° C., ·71928, apparent or uncorrected.

Had this ether been entirely free from alcohol and water it should have had the same specific gravity throughout the distillate. No part of it was, therefore, entirely absolute for reasons similar to those previously given in regard to alcohol.

The first fraction may, however, be accepted as very nearly absolute, or at least as nearly so as any yet obtained by this writer, or as obtainable by water and chloride of calcium in the ordinary way.

Another portion of about 5 litres of very good ether was well washed with water by hand shaking, and was then digested upon well-burnt quick-lime for four months, with frequent shaking by hand. This was separated from the lime and distilled in the same way as the first portion, but gave a higher specific gravity and a greater difference between the fractions.

Both these portions of nearly absolute ether were separately set aside in well-stoppered bottles with a fresh portion of recently fused and powdered chloride of calcium to be occasionally shaken by the machine until next winter, when a low temperature may enable the work to be resumed under more favourable conditions, and when a greater length of digestion may establish a better balance between the affinities in the reactions with the chloride of calcium.

It is stated by several good authorities that absolute ether in contact with moisture, or even with moist air, regenerates small proportions of alcohol, and if this be true it materially increases the difficulties of the problem of absolute ether.

The recognition of absolute ether, even by the more recent tests, is by no means easy. The test by admixture with equal volumes of oil of copaiba, or of carbon disulphide, is not at all critical, as the ether obtained by the writer does not show the faintest cloudiness with either of these liquids when previously mixed with ·1 per cent. of watery alcohol.

Fuchsine is stated to be a critical test for alcohol and water in ether, If a very minute quantity of powdered fuchsine be shaken with a considerable quantity of ether, the ether remains colourless if quite free from alcohol and water, but takes a pink tint, the depth of which is proportionate to the alcohol and water present.

In the application of this test it is first necessary to discriminate between the fuchsines of the market. Both acetate and hydrochlorate of rosaniline are sold as fuchsine. The acetate is in large crystalline fragments, while the hydrochlorate is in small nacreous tables, both of a beautiful green colour. The acetate is the appropriate salt for this testing. It is, however, not a test for alcohol at all. Increasing proportions of nearly water-free alcohol up to about ·2 per cent. may be added to a nearly water-free ether without increasing the depth of the tint from fuchsine. For water the fuchsine seems to be a very sensitive test indeed, when very carefully applied, but such critical application is attended with some difficulties. The acetate of rosaniline should be used in fine powder. Being somewhat hygroscopic it takes a little moisture from the air in powdering, even if powdered in a warm mortar, quickly, and in a moderately dry air. If the powder has any accidental moisture,—and a little is unavoidable,—this, with its dissolved acetate, will be taken by the ether, even though this latter might have been water-free, and will communicate a tint. Again, if the test tube or flask in which the ether and the acetate be shaken together contain much moist summer air, it will supply moisture enough to give a tint, or increase that from other sources. The tube or flask should be nearly filled up with the ether, and the depth of tint should be compared with a similar flask or tube similarly filled with the ether without the acetate, and the two should be looked at side by side against white paper. The writer has as yet seen no ether that did not give a perceptible tint under this management, when very closely scrutinized, and this is not remarkable in association with the fact that .1 milligram of acetate of rosaniline gives a similar faint tint to 10 litres of colourless distilled water. By calculation this would indicate the presence of about ·001 per cent. of water, a proportion almost unavoidably carried to the ether by the acetate and the air in the testing.

Ether which stands this test in this way will bear the addition of nearly ·2 per cent. of absolute alcohol of a specific gravity of ·79356 at 15·6° C., compared with water at the same temperature as unity, without distinctly deepening the tint. But if the alcohol added has a higher density the tint will be proportionately deepened by it.

The critical test for alcohol in ether is that of Lieben as modified by Hager. This test is based on the statement that in the presence of iodine and an alkali every trace of alcohol present will be converted into iodoform, which iodoform will separate out in the characteristic form of its yellow crystals. But in order to be very critical this test has to be most carefully guarded and even then its applicability to ether is doubtful. It cannot be applied directly to the ether for reasons that are obvious. The ether, say 20 c.c. of it, must be well and thoroughly shaken with 10 c.c. of distilled water, and the water be separated for the testing. Now if ether in the presence of water regenerates traces of alcohol, as is said on good authority to be the case, it is difficult to see how this water, with which the ether is washed for the testing, can be free from traces of alcohol, even though no alcohol was previously present in the ether. The writer has seen his absolute ether so stand this test as to leave it very doubtful whether a trace of iodoform was or was not formed, after many repetitions, but has never seen it unmistakably absent. The test is best applied as follows:—

To the 10 c.c. of washing water three or four drops of a 10 per cent. solution of caustic potassa are added. Then a solution of iodide of potassium saturated with iodine is added until the solution is rather deeply coloured by it. Finally, solution of potassa is again added until the liquid is decolorized. The result is never entirely negative, though at times the precipitate is so scanty as to be hardly perceptible until after the lapse of several hours. The precipitate is then examined with a good glass, when yellow crystals will be found among the particles. With the same materials this test varies considerably from some causes not ascertained, but so far the writer has not failed to find minute microscopic yellow crystals supposed to be iodoform.

It is stated by many authorities that absolute ether is soluble in water in the proportion of one volume in ten of water, but this is a current mistake. Even at a temperature of 25° C. one volume requires 11·1 volumes of water for solution.

When 15 c.c. of the ether and 15 c.c. of water are

shaken together at 25° C., there is a contraction of volume to about 29·8 c.c., the ethereal stratum measuring 15 c.c., and the water 14·8 c.c. This ether saturated with water is rendered very decidedly pink in tint by fuchsine.

A prominent object in obtaining absolute ether is that it forms a standard by which to compute, with a practical degree of accuracy, the strength of the higher grades of ether which are not absolute, and the ether obtained by the writer, if not entirely absolute, is near enough for all practical purposes. By the large apparatus and management described, a very uniform product having an apparent specific gravity at 15° C. of ·72450 compared with water at 4° C. is obtained as before stated, and this ether by all the tests proves to consist of about 95·9 per cent. absolute ether, and 4·1 per cent. of alcohol which contains a small proportion of water. The strength of this 4·1 per cent. of alcohol was not accurately determined, but it was estimated to be about 90·75 per cent. corresponding to a specific gravity of ·820 at 15° C.

This would give for the composition of such an ether the following formula:—

Absolute ether		95·9 per cent.
Absolute alcohol . .	3·72	
Water	·38	4·1 „
		100·0

This is believed to be sufficiently accurate for all practical purposes, and, moreover, it is believed to be about the strength of the alcohol which distils over with the ether for all the strengths of ether which are above 88 per cent. The lower the strength of the ether distilled the lower will be the strength of the alcohol which goes over with it, so that the proportion of water constantly increases from absolute ether to the lowest dilution. This proportion of water increases very slowly down to the range of about 88 per cent., but then increases more rapidly down to 80 per cent, and more rapidly still down to 70 per cent. The total increase, however, did not appear to be so great as to seriously interfere with the construction of a table which, without any pretensions to scientific accuracy, might still prove to be very useful. Such a table has been constructed and is offered herewith.

Ether Table.

Table of specific gravities of combinations of absolute ether and alcohol; the ether having a specific gravity of ·71888, and the alcohol of ·82012, both liquids at 15° C.=59° F., compared with water at 4° C.=39·2° F. as unity. Or, the ether of ·71890, and the alcohol ·82016, both liquids at 15·6° C.=60° F., compared with water at 15·6° C.=60° F. as unity.

This table is trustworthy to the third decimal place, and moderately accurate to the fourth.

The corrected columns are corrected for the expansion of glass only.

P.c by Weight.	Compared with Water at 4° C.=39·2° F. as Unity.							Compared with Water at 15·6° C=60° F. as Unity.		
	Weighed at—							Weighed at—		
	4° C.= 39·2° F.	15° C.=59° F.		15·6° C.=60° F.		25° C.=77° F.		15·6° C.= 60° F.	25° C.=77° F.	
	True.	Apparent.	Corrected.	Apparent.	Corrected.	Apparent.	Corrected.	True.	Apparent.	Corrected.
100	·73128	·71908	·71888	·71838	·71817	·70788	·70751	·71890	·70842	·70825
99	73257	·72040	·72020	·71969	·71948	·70923	·70886	·72021	·70975	·70958
98	·73386	·72172	·72152	·72101	·72080	·71057	·71020	·72152	·71108	·71091
97	·73415	·72205	·72185	·72233	·72212	·71192	·71155	·72284	·71241	·71224
96	·73644	·72438	·72418	·72364	·72343	·71326	·71289	·72416	·71374	·71357
95	·73764	·72564	·72544	·72490	·72469	·71457	·71419	·72541	·71506	·71489
94	·73884	·72690	·72670	·72616	·72595	·71589	·71551	·72666	·71638	·71621
93	·73904	·72814	·72794	·72742	·72721	·71721	·71683	·72792	·71770	·71753
92	·74124	·72938	·72918	·72868	·72847	·71852	·71814	·72918	·71902	·71885
91	·74245	·73064	·73044	·72994	·72973	·71982	·71944	·73043	·72033	·72016
90	·74366	·73190	·73170	·73121	·73100	·72113	·72075	·73168	·72164	·72147
89	·74487	·73215	·73195	·73248	·73227	·72245	·72207	·73298	·72295	·72278
88	·74608	·73440	·73420	·73374	·73353	·72374	·72336	·73428	·72426	·72409
87	·74728	·73557	·73537	·73494	·73473	·72495	·72457	·73547	·72547	·72530
86	·74847	·73674	·73654	·73614	·73593	·72617	·72579	·73666	·72669	·72652
85	·74968	·73791	·73771	·73734	·73713	·72739	·72701	·73785	·72791	·72774
84	·75086	·73908	·73888	·73854	·73833	·72860	·72822	·73904	·72912	·72895
83	·75193	·74028	·74003	·73974	·73953	·72982	·72944	·74022	·73034	·73017
82	·75299	·74149	·74129	·74095	·74074	·73103	·73065	·74141	·73156	·73139
81	·75406	·74270	·74250	·74216	·74194	·73224	·73186	·74260	·73278	·73261
80	·75512	·74390	·74370	·74336	·74314	·73346	·73307	·74378	·73400	·73383
79	·75634	·74508	·74488	·74453	·74431	·73469	·73430	·74495	·73523	·73506
78	·75756	·74627	·74606	·74570	·74548	·73592	·73553	·74612	·73645	·73628
77	·75378	·74746	·74725	·74687	·74665	·73715	·73676	·74729	·73767	·73750
76	·76000	·74864	·74843	·74804	·74782	·73838	·73799	·74846	·73890	·73873
75	·76127	·74991	·74970	·74934	·74912	·73970	·73931	·74975	·74022	·74005
74	·76255	·75119	·75098	·75063	·75041	·74102	·74063	·75104	·74154	·74137
73	·76383	·75247	·75226	·75193	·75171	·74234	·74195	·75233	·74286	·74269
72	·76510	·75374	·75353	·75322	·75300	·74366	·74327	·75362	·74418	·74401
71	·76640	·75504	·75483	·75452	·75430	·74501	·74462	·75492	·74548	·74530
70	·76770	·75634	·75613	·75582	·75560	·74635	·74596	·75623	·74687	·74669

Ths absolute ether actually obtained by the writer is the basis of this table, and the specific gravities were taken by means of the flask. For diluting the ether an alcohol was prepared of a specific gravity of ·82012 at 15° C., water at 4° C. being taken as unity, or ·82016 at 15·6° C., compared with water at 15·6° C. as unity, such

alcohol corresponding very closely to 90·75 per cent. absolute alcohol and 9·25 per cent. water. No attempt was made to reduce the strength of this alcohol for the weaker dilutions,—first, because the rate was not known, though known to be small; and secondly, because the alcohol unavoidably grew weaker as the dilutions and weighings proceeded, by the abstraction of moisture from the summer atmosphere.

From this it may be seen that no such table can be very accurate, and this is the probable reason why such tables have not before been made. But for those who have much to do with ether, a table of even a fair degree of practical accuracy is far better than none at all; and since the number of those who handle and use ether is constantly and rapidly increasing, and will increase more rapidly still as it is more cheaply produced and its uses extend, such tables will become more and more useful.

The dilutions for the table were commenced with the absolute ether of this writer, and carefully adjusted alcohol of ·82016, but from shaking together, and from other exposure to moist air, both the ether and the alcohol of the mixtures became slowly weaker throughout the range of the table, and no attempt was made to prevent this, from considerations mentioned above. Dilutions were made and accurate specific gravities taken for each difference of 2 per cent. down to 88 per cent., and below that for each difference of 4 per cent., all the other specific gravities being supplied by interpolation. And as with alcohol so with ether, two standards of unity are in common use, specific gravities are given by both these standards, namely, water at 4° C. and at 15·6° C.

EULACHON OIL—A SUBSTITUTE FOR COD LIVER OIL.*

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The bays and estuaries of the Pacific coast of British America and Alaska are annually visited by immense shoals of a small fish popularly known as the candle fish, or, adopting the vernacular name, as the eulachon or outachon. This fish belongs to the family of the salmonidæ, and bears the scientific name Thaleicthys pacificus (Richardson) Girard. It is nearly allied to the capelin, which it resembles also in its habits.

The Indian name is variously spelled eulachon, eulachan, hoolacan, oolachon, ootachon, etc., and is corrupted by the English settlers at Victoria into hoolakins.

The fish is also frequently confounded with other species, and in Oregon is generally known as smelt. Its habitat is the northern part of the Pacific Ocean. In spring it approaches the shores to deposit its spawn, entering the bays and estuaries in countless numbers. It never goes far from the ocean, however, although multitudes of the fish are taken near the mouths of the large rivers, particularly in Frazer's river and in the Naas.

The candle fish is less than a foot in length. It is described as having a somewhat pointed and conical head, a large mouth, teeth on the pharyngeals, and the tongue rough; the lower jaw, palatines, and vomer destitute of teeth. Its colour is greenish yellow on the back, passing into silvery white on the sides and belly, sparsely spotted with dirty yellow. The spawning season is in April and the first half of May. During their run they furnish food not only to the Indians, but to thousands of sharks, halibut, porpoises, and other predatory fish. As a pan fish the eulachon is said to have no superior, but the fish is valued chiefly for its oil, which is used as food by the Indians. So rich in oil is the entire fish that when dried, it serves the natives for torches, whence the name candle fish. The aborigines take the fish in immense numbers by the aid of a primitive contrivance, resembling a rake or comb, the moonlight nights being the most favourable time for carrying on the operation.

The fish are submitted to a rude operation for "rendering" the oil, or they are dried, and smoked. In recent times the dried and salted fish have become an important article of export from Victoria, and there is now on the Naas river a manufactory for the oil, which has been employed to some extent as a substitute for cod liver oil. It has been used medicinally to a considerable extent in British Columbia, but I do not find any record of clinical observations with regard to its therapeutic value.

Chemical analysis, of course, cannot reveal the medicinal properties of any drug. Cod liver oil itself is an example of this. While universally accepted as an agent of singular efficiency in promoting nutrition, particularly in strumous and tubercular patients, it has thus far guarded as a profound secret the cause of its efficiency, and the reason of its superiority in this respect over other oils, vegetable or animal. It has been frequently subjected to chemical analysis, and one wonderful discovery after another announced with flourish of trumpets, each supposed, for a while, to furnish a key to the mystery, but each in turn has been abandoned, and the medical profession generally regard the remedy as nothing more than a concentrated and easily assimilated food. Iodine, phosphorus, iron, biliary acids, cholesterin, and oxide of propyl are among the constituents of the oil which have been supposed to give it its peculiar medicinal character, but none of these substances is present in a quantity sufficient to justify any such hypothesis, and one after another all have been abandoned as unsatisfactory.

Some other animal oils, however, have been found to improve nutrition in much the same way as does the familiar cod liver oil; only by clinical experiments can we determine the value of any new claimant for a share of the honours which cod liver oil has monopolized.

A comparison of the oils, however, may prove of interest and, possibly, even of value, should eulachon oil become a common article of commerce, whether it should prove to be more or less valuable than its rival.

The oil of the candle fish as it is sent into the market at present contains much palmitin and, probably, stearin, so that at common temperatures it is only semi-fluid.

The olein, which for medicinal purposes, at least, must be regarded as eulachon oil, forms a limpid fluid of a pale straw colour and fishy odour, unlike that of cod liver oil; perhaps, to many, less repulsive. Personally, I find it impossible to overcome my natural aversion to any fish oil; those who are less fastidious in their tastes declare that the oil of the candle fish is positively delicious. Probably most patients would find little to choose between eulachon and cod liver oil.

In specific gravity the eulachon oil differs from any other oil heretofore described. At a temperature of 59° F. (15° C.), water at the same temperature taken as standard, its specific gravity is 0·9071; at 77° F. (25° C.), the apparent specific gravity is ·9012, referred to same standard. The specific gravity of cod liver oil ranges from 0·92 to 0·93, generally being about 0·927, at 59° F. Other fish oils have nearly the same range of specific gravity, and the vegetable oils, which consist chiefly of olein, are only a trifle lighter, specific gravity 0·915 to 0·920; and the same is true of animal oils, like lard oil, neats' foot oil, etc., which consist mainly of olein. Shark oil is much lighter (specific gravity 0·870), and so also is sperm oil (specific gravity ·875 to ·883). I do not know whether shark oil has been subjected to chemical analysis, but from its specific gravity one may infer that it does not consist wholly of olein, and this is known to be the fact in regard to sperm oil.

In viscidity there is a notable difference between cod liver oil and the eulachon oil. Under the same conditions of temperature and pressure, 40 parts only of the eulachon oil will flow from an orifice which will discharge 45 or 46 parts of cod liver oil. Experiments, however, must

* From the *Therapeutic Gazette*, September 1834.

embrace a larger number of samples than mine have done to be of much value.

When mixed with sulphuric acid (5 volumes of oil with 1 of acid) the temperature rose 55° C. (100° F.). With cod liver oil the elevation of temperature is about double this, 112° C. (202° F.).

The colour reactions with acids are quite different from those of cod liver oil. Mixed with one-third its volume of nitric acid (specific gravity 1·27), it develops at once a pink colour, which fades slowly to amber. After fifteen hours' standing the mixture is considerably thickened, and is of a deep amber colour with a reddish cast. Cod liver oil treated in the same manner turned at first pink, faded rapidly to pale amber; after fifteen hours the colour remained pale amber, and the mixture was more fluid than the former, but with thickened portions partially separated.

With Cailletet's test—a mixture of phosphoric acid, specific gravity 1·44, 12 parts, sulphuric acid, specific gravity 1·84, 7 parts, nitric acid, specific gravity 1·37, 10 parts—eulachon oil produces at once a pink colour, fading to a shade of brown; at the end of fifteen hours the colour of the solution was of a pale reddish-brown.

Cod liver oil shows a similar initial coloration under this test, but fades to straw colour or amber, if the oil is pure.

Sulphuric acid does not produce in eulachon oil the rich purple colour which it gives cod liver, and other oils containing biliary constituents. It produces instead a deep brown, verging as much towards yellow as towards red.

With the claidin test eulachon oil solidifies rapidly; after fifteen hours a small portion only of the oil remains unsolidified—colour of the mixture, brown. In the case of cod liver oil the action is much less rapid; at the end of fifteen hours there remains still a large proportion of fluid, which is of a very dark colour—resembling molasses.

The oil leaves only a trace of ash when ignited, and the constituents of this probably are unimportant. The oil probably contains, like cod liver oil, a trace of iodine—the quantity of this element present in the latter is greatly over-stated in the books. It is altogether too minute to be regarded as of any influence, even if the iodine is present, as is believed by some, in the form of an organic compound. All fish oils have been found to contain iodine, and in proportions not much smaller than cod liver oil itself.

A portion of the eulachon oil was saponified and the soap decomposed. The fatty acids thus obtained amounted to 95·85 per cent. of the oil. As appeared subsequently, however, this is not all fatty acid.

The oil was found to contain about 20 per cent. of palmitic and stearic acids, 60 per cent. of oleic acid, and 13 per cent of an unsaponifiable substance, which is the most peculiar and interesting thing about it. This substance is of an oily consistency at ordinary temperature in summer, has much lower specific gravity than oleic acid, or any other constituent of ordinary fats specific gravity ·865 to ·872 at 59° F., and seems to resemble the unsaponifiable constituent of sperm oil.

This interesting substance I hope hereafter to make the subject of further investigation to determine its chemical composition, and its behaviour towards reagents. At present it is enough to call attention to its existence as a considerable constituent in this oil, and to suggest the probability that it may give to the oil properties quite distinct from those of most animal oils. The low specific gravity of the substance, and its indifference to most reagents remind one strongly of the paraffins, and now that petroleum and petroleum oil are recognized to have a positive influence in tuberculous complaints we shall not be surprised if we find that eulachon oil owes any therapeutic power it may be found to possess to this peculiar body.

Cod liver oil, it is true, does not contain anything corresponding with this substance, or if it does the quantity must be very small. Cod liver oil contains about 80 per cent. oleic acid, 8 or 9 per cent. of palmitic and stearic acids, and only 1·82 per cent. (Allen) of unsaponifiable matter, a considerable proportion of which is cholesterin.

We shall await with interest reports from competent observers of clinical experience in the use of eulachon oil, prepared to find in the new remedy a valuable addition to the materia medica, prepared equally to accept the verdict of such experience even though it prove adverse.

RELATION OF PLANTS TO HYGIENE.*

BY J. M. ANDERS, PH.D.

The theme is a broad one and has within the past few years attracted much attention. It would therefore be impossible for me, in the time at my command, to present the whole subject in detail and I propose simply to briefly touch upon points of scientific interest alone, and to consider more fully those that are of greatest importance from a hygienic standpoint. I wish to premise further, by stating that much of what I shall bring before you has appeared in my previously published papers, but chiefly in the line of original investigation. Some new light has, however, been recently thrown upon the subject as the result of investigations not yet published, which, I trust, may be the means of exciting trains of thought.

I need hardly stop to remind you of the fact that there was formerly, and in some quarters still is, perhaps, a superstition that plants and flowers are unwholesome in living and sleeping rooms. It is not a matter of surprise then that plants in winter were kept in cellars and other apartments, not much used by the family, to be merely kept alive till spring. Until within a few years, this belief was very general, not only among lay people, but the most illustrious professors were in the habit of speaking in strong terms of their baneful effects, particularly in sleeping rooms and the sick chamber. Perhaps, I could in no way give you a more correct idea of the universality of this opinion than by quoting a short extract from a letter on the subject of "Growing Plants in the Sick Chamber," written by my friend, Dr. Hiram Corson, a distinguished physician and well-known writer upon medical topics, and published in the *Norristown Herald*, of December 2, 1881. He writes: "From my observation during many years, I believe that not more than one physician in ten but advised against them. Indeed, I never knew of a single one who gave approval of such a course. So current was the belief of their injurious tendency that the question was not put to the physician at all."

We may now consider for a moment the reasons to account for the prevalence of such an idea and to inquire into the truthfulness or falsity of them. In the first place it must be borne in mind that the notion was not held because plants in rooms were not admired nor because their presence gave no pleasure. The love of plants and flowers has always existed in the hearts of most persons, and though they have very generally been banished from our living apartments in the past this innate affection has during all the ages defied the assaults of this baseless prejudice. Again, their æsthetic and refining influences have never been disputed. Why then should they have been discarded by us so generally or upon what sort of proof was the old notion of their injurious effects based? The answer could be readily given by every schoolboy of twelve years, and may be briefly stated as follows:—Plants at night exhale carbon dioxide and absorb from the air oxygen, thus tending to affect injuriously the harmonious composition of the

* A lecture delivered before the Alumni Association of the Philadelphia College of Pharmacy. Reprinted from the 'Annual Report.'

atmosphere. On the other hand it was once considered safe to assume that the function carried on by plants in daytime, viz.: The absorption of carbon dioxide and giving out oxygen improved the conditions of the air, at least in closed apartments. That these ideas were erroneous has been decided by Max Von Pettenkofer (*Pop. Sci. Md.*, for February, 1880), who has experimentally shown that the amount of these gaseous substances, carbon dioxide and oxygen, taken from or given to the atmosphere is too small to have any appreciable effect either for good or evil, even when kept in closed rooms.

This learned inquirer, in his admirable paper, gives the following account of his experiments:—"When the Winter Garden in Munich was completed and in use, it occurred to me to make experiments on the effect of the whole garden on the air within it. There could not be a more favourable opportunity for experimenting on the air in a space full of vegetation. This green and blooming space was not exposed to the free currents of air which at once immensely rarefy all gaseous exhalations, but was kept under a dome glass, through which only the light of heaven penetrated. Although not hermetically sealed, the circulation of air in such a building compared with that in the open air was reduced over a hundred thousandfold.

"I asked permission to make experiments for several days and nights which was readily granted. Now, what was the result? The proportion of carbonic acid in the Winter Garden was almost as high as in the open air. This greatly surprised me, but I hoped at any rate to have my traditional ideas confirmed. I had hoped to find less carbonic acid in the day than in the night, supported by the fact that the green portions of plants under the influence of light decompose carbonic acid and develop oxygen. But even here I was disappointed, I generally found carbonic acid increasing from morn till evening, and decreasing from night till morning. As this seemed really paradoxical, I doubled my tests and care, but the results remained the same. One day it suddenly became clear to me why there was always more carbonic acid by day than by night, I had only been thinking of the turf, the shrubs and trees which consume carbonic acid and produce oxygen, and not of the men and birds in the Winter Garden. One day when there were considerably more men at work there than usual, the carbonic acid rose to the highest point, and sunk again to the average during the night. The production of carbonic acid by the working and breathing of human beings was so much greater than that consumed by the plants in the same time."

From these results Professor Pettenkofer justly concludes that the amount of carbon dioxide in the air in the Winter Garden cannot be reckoned as telling for or against the hygienic value of vegetation in an enclosed space. These experiments speak for themselves. It should be specially noted, however, that contrary to the old and widespread traditional notion that plants by giving out carbon dioxide at night render the air harmful, there was found to be even less of this gas than in the daytime. The explanation of this fact is important. It does not attempt to disprove that plants give out carbon dioxide at night, but as Pettenkofer has pointed out the production of carbon dioxide by the working and breathing of human beings in the daytime was so much greater than what the plants give off at night, that the latter amount becomes almost inappreciable. There remains, therefore, no valid objection to the practice of keeping plants in our dwellings, not even in sleeping rooms, and the sick chamber. Popular traditions must vanish before the accumulating evidences, the result of scientific research.

Now let us look at the opposite side of this question and consider what may be called the beneficial influences plants and flowers have upon the atmosphere. We shall find that these are manifold and important. The fact that plants have an æsthetic influence, as already incidentally touched upon, is acknowledged on all hands. And the pleasure their presence gives by their effects upon our senses, their power to relax tension of mind, as well as the feeling of congenial companionship they give, are all evidences of their utility from an æsthetic point of view.

But there are other and far more important hygienic purposes subserved by plants, and chiefly on account of two functions which are in more or less constant operation; first, transpiration or the exhalation of watery vapours, and secondly, the generation of ozone by flowering plants.

As elsewhere stated, plants act as efficient and perfect atomizers, the amount of their exhalations being quite surprising. In order to show the rate of transpiration I may be pardoned for making a somewhat concise abstract from an experimental essay of my own upon the subject of transpiration. "In clear weather the evaporation by night, as compared to that which taks place in the day, appears to be about in the ratio of one to five. In some cases no loss (by transpiration) occurred on dewy or cloudy nights. Under ordinary circumstances the evaporation at night was about the same indoors as in the open air. The rate of transpiration during the day showed a very different relation, giving a ratio of two to one in favour of the open air. Of the whole amount evaporated during the day, half was given out between the hours of 11 a.m. and 3 p.m., as shown by repeated testing. The average rate of transpiration for soft, thin-leaved plants, in clear weather, may be put down at about $1\frac{1}{4}$ ounces per day (twelve hours) for every square foot of leaf surface. The lantana shows nearly 2 ounces to the square foot of surface. The camellia, with its dense smooth leaves, averaged less than $\frac{1}{2}$ ounce to the square foot of leaf surface per day.

"A few calculations may serve to impress the importance of this ratio of transpiration deduced from these experiments. According to the above rate the Washington Elm, at Cambridge, a tree, it is stated, of no very large size, with its two hundred thousand square feet of leaf surface, would transpire seven and three-quarter tons of watery vapour in twelve diurnal hours of clear weather."

From such facts as these it may fairly be assumed that the transpiratory function in plants must be a powerful agent in maintaining the humidity of the surrounding medium. But we have at hand ample experimental data to show the correctness of this conclusion.

From observations which I have made over a period of several weeks on the air of my former private reading and sleeping room at the Episcopal Hospital, which was kept warm by air heated by steam, and simultaneously on the air outside, it was found that the air in the former position was appreciably dryer than in the latter, the average complement of the dew point being on the whole about five degrees greater. The room adjoining mine, occupied by my co league, was very kindly left for a time at my disposal. In it were kept a few plants in pots with a leaf surface not exceeding about twelve square feet. The dimensions of the rooms were similar, each being twenty feet long, eleven feet wide and sixteen feet high. Each had one window fronting east, in which the plants were kept. The average temperature and dew point were noted simultaneously, and the result showed uniformly, for a period of eighteen days, that the complement of the dew point averaged $1\frac{1}{2}^{\circ}$ less in the room containing the plants. These observations were made during April, 1878, when very little heat was required, still the windows and doors were kept closed during the day. Calculating from these results, the effect of twenty-four square feet of leaf surface on the air of a room half the size of the above would be to increase the humidity sufficiently to raise the dew point 6° Fahrenheit higher than it would be if there were no plants in the room. It was possible that the variation in the amount of moisture

in the two rooms tested might be due to considerations other than the presence of the plants, it was deemed necessary to vary the conditions and make further observations. Accordingly after placing some plants in the window of my own room, I took the average temperature and dew point, and compared them with those of an adjoining room containing no plants. No artificial heat was required during the time of these experiments. It was found that when the window was kept open so as to cause very free ventilation, no appreciable difference in the humidity of the two rooms was observed, but if the windows were kept closed for a few (say three) hours, it would make a difference of from one and a half to two degrees in the complement of the dew point, the room having the plants showing the lesser complement. This difference was maintained almost when the windows were opened just enough to allow a gradual interchange of the contained air; but, as before intimated, a draft, though it might hasten transpiration, would, by carrying off the vapour, prevent an increase of moisture in the air of the room. It is well known that the air of our houses contains too little moisture. This is particularly the case where dry air furnaces are used for heating purposes. About four years ago I had made under my personal control some observations with a view of determining more precisely the extent of the difference between the humidity of apartments thus heated and the outer air. To my surprise it was found that the mean average complement of the dew point was seven degrees Fahrenheit greater for the heated air than the air outside. Now it can be readily seen that under these circumstances a certain number of plants in a heated room would have the effect of raising the humidity to the healthy standard through their powers of transpiring aqueous vapour and thus render great hygienic service. In order to fully appreciate the value of house plants in this connection it will be necessary to take into consideration the evil consequences to health resulting from dry heat. This question is one of great interest, but time is wanting to treat it fully here; suffice it to state briefly the most important hurtful effect,* as described by Professor A. Stille, to wit: "A great demand is made upon the system to supply the air with moisture; the skin and pulmonary mucous membranes are dried, and a condition is induced which is expressed in irritability of the nervous system, paleness and susceptibility of the skin to cold, liability to pulmonary diseases, and, in a word, deterioration of all the functions." If plants are capable of obviating such distressing symptoms in consequence of this function of transpiration increasing the atmospheric humidity, we must consider this an office of no mean importance.

The generation of ozone by plants, the other function alluded to, which brings them into hygienic importance, deserves careful consideration. Time would fail me were I to attempt to give a detailed account of these researches here, but a brief summary of the most important results seems incumbent. My first observations were conducted in Horticultural Hall, Fairmount Park, for I thought this place afforded a good opportunity for settling the question whether plants do or do not generate ozone, but in this I was measurably disappointed. The air of the main hall, and also the smaller side houses, was tested for ozone with almost entirely negative results. During these experiments there were numerous visitors attracted to the hall on account of the great beauty of the plants, and this circumstance it was thought might be the cause of the failure of the tests, since it is a known fact that ozone is never detectable in occupied dwellings, to which the hall, during the time of these observations, might have been very justly compared.

Later experiments at a time when the hall was frequented by comparatively few or no visitors, gave somewhat more encouraging results, but they were not thought sufficiently striking to base thereon positive conclusions. In this series of experiments the external air was simultaneously tested for the sake of comparison between the air on the interior and that on the exterior, and it was observed that the results were nearly identical in the two situations, with a preponderance of reaction in favour of the exterior, thus leading naturally to the opinion that the external conditions might have affected the results on the inside. An exception, however, must be noted in the case of the so-called propagating house; here the results were more striking than those upon the outside. This circumstance was due to the fact that this house was filled with flowering plants, as will appear hereafter.

(*To be continued.*)

* See 'Beneficial Influence of Plants,' by the author. *Amer. Nat.*, Dec. 1878.

THE UNCERTAIN COMPOSITION AND ACTION OF GREY POWDER.

In a letter addressed to the Editor of the *Lancet*, Dr. George Johnson writes:—

"Grey powder—hydrargyrum cum cretâ—is generally believed to be one of the mildest of the preparations of mercury, and as such it is often prescribed for infants and young children, its composition being supposed to be one part of metallic mercury to two of chalk. For many years I have entirely ceased to prescribe that preparation, and, with your permission, I will briefly state my reasons for discontinuing its employment. When I was in the habit of using it I found its operation to be most uncertain and variable; at one time its action was mild, while at another it caused severe pain, vomiting and purging. My mistrust of it was finally confirmed by a conversation which I had many years ago with Professor Redwood of the Pharmaceutical Society. The Professor told me that in consequence of having heard frequent complaints of the uncertain and often violent action of the drug, he had analysed a number of specimens, and the result was that all, or nearly all, were found to contain a variable proportion of the two oxides of mercury. The last number of the *Pharmaceutical Journal* (September 20, p. 230) contains an interesting report and discussion on the strength and condition of commercial specimens of hydrargyrum cum cretâ and other mercurial preparations. Out of twelve specimens of grey powder analysed not one was found free from the oxides of mercury. One sample contained as much as 2·2 per cent. of mercurous oxide and 4·67 of mercuric oxide; and another had 6·15 of mercurous oxide with 2·8 of mercuric oxide. The presence of so large a percentage of the oxides of mercury explains the occasional violent action of the drug. The mercuric oxide meeting with hydrochloric acid in the stomach would be at once converted into the poisonous perchloride.

"From the discussion which followed the reading of the paper it would appear that the variable proportion of the oxidized mercury depends, not upon the manner in which the ingredients are rubbed together, whether by hand, with a mortar and pestle, or by steam-driven machinery, but upon the length of time during which the drug has been exposed to the air after its preparation; so that, while a freshly prepared specimen might contain no oxidized mercury 'in a month,' as Mr. Tyrer, a manufacturer, said, 'a difference would be perceptible, in three months still more, and so on until a point was reached when the oxidation ended, though what that point was he was not prepared to say.'

"My object in this communication is to direct the attention of the profession to the uncertain composition and operation of this commonly employed drug, and especially to point to the occasionally distressing results of its administration to young children.

"Many years ago, during a consultation with Sir Benjamin Brodie, he asked me how I would treat syphilis in an infant. I replied, 'With grey powder;' upon which he said, 'And the result would be that you would gripe and purge your patient to death.'"

The Pharmaceutical Journal.

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PHARMACOPŒIA REVISION.

ALTHOUGH for the present debarred by what is now generally considered to be an injudicious spirit of exclusiveness from taking a direct part in those revisions of the national pharmacopœia which become indispensable with the lapse of time, the pharmacists of this country are far from being indifferent to the general subject. We may be excused, therefore, if in the presence of the extreme reticence which precedes the issue of the new edition of the British Pharmacopœia that has been announced, apparently on authority, as probable about this time, we devote some little space occasionally to the sayings and doings respecting the pharmacopœias of other countries. The principles ruling the inclusion of remedies in a pharmacopœia must always be of paramount importance in stamping the individuality of the work, and the characters in this respect of the three most recent additions were pithily hit off by Mr. WILLIAMS in his address to the Pharmaceutical Conference. It is also a point, however, upon which great difference of opinion may exist, for while there are those, for instance, who look upon the British Pharmacopœia as insufficiently comprehensive, some complaints in a medical contemporary, to which we referred a short time ago, were based upon the presumed redundancy of articles included in it. It is not surprising, therefore, that the much more widely inclusive United States Pharmacopœia should be criticized from a similar standpoint, and this has been done in a very effective manner in a paper by Professor BOLLES, of the Harvard Medical School, quoted in the last number of the *Ephemeris*. It appears that by the courtesy of three of the principal pharmacists in Boston Professor BOLLES was enabled to analyse 3726 prescriptions dispensed by them as to the medicaments ordered and he reports that he found that this large number included the names of only 504 out of the 994 articles contained in the present edition of the United States Pharmacopœia. Of these 504 as many as 236 occurred five and less than ten times, 167 ten and less than twenty-five times, and 80 others less than fifty times. Quinine sulphate headed the list, being ordered in 292 of the 3726 prescriptions, morphine sulphate in 172, potassium bromide in 171, potassium iodide in 155, tincture of chloride of iron in 134, bismuth subnitrate in 133, glycerine in 120, syrup of tolu in 120, syrup in 108. These were all the articles that were ordered more than one hundred times. Not a single decoction had been prescribed, and only one infusion and three wines; indeed the fluid extracts seemed to have practically displaced these three forms of preparations, and although tinctures still figured largely, an opinion is expressed that their disappearance is only a matter of time. The investigation was subsequently extended to about ten thousand prescriptions, without, however, materially effecting the results.

It is evident, therefore, from Professor BOLLES'S figures, that so far as the pharmaceutical needs of the city of Boston are concerned the United States Pharmacopœia contains a large amount of almost, if not quite, useless surplusage, and although this would no doubt be reduced in its relative proportions if a more extensive area were under consideration, the probability is that there would prove to be still a large number of drugs and preparations so rarely required that if the pharmacist keeps them on his shelves, as he is supposed to do, it can hardly be expected that they are always sufficiently fresh to be in a proper condition for use. Commenting in the Journal referred to upon this state of things, Dr. SQUIBB expresses a decided opinion that a reform is desirable as well as possible. He sees in the multiplicity of preparations of the same drug little justification beyond the individual habits and preferences of particular practitioners, and as he considers these to be to a great extent simply prejudices adopted from teachers in the medical schools, he argues that if those authorities were to take counsel together and advocate the use of only the best preparation of a drug the reform would not be long in coming. But it is within the prerogative of doctors to disagree, and the anticipation of such unanimity amongst them is certainly evidence of a sanguine mind. As to Dr. SQUIBB'S own preference, and he is no mean authority, there can be no mistake. Dr. SQUIBB evidently looks upon the fluid extract as the best—if not the only necessary—form of preparation, and the one that, whilst not prone to change, may be made most consistent with that accuracy and uniformity in strength which, notwithstanding what has been said lately on this side of the Atlantic, he holds to be of primary importance in the materia medica.

Looking across to the European continent we find that German pharmacists are already busily engaged in making elaborate arrangements for the preparation of materials to place at the disposal of the official Committee when it takes up the next revision of the Pharmacopœa Germanica. This lively interest is an inevitable result of the responsible and reasonable position which German pharmacists enjoy in respect to that Committee. But it is strikingly in contrast with the negation of interest consequent

upon the extraordinary exclusive and hand-to-mouth conditions which obtain in this country in the preparation of the national medicine book, and which allow of an observation being made again and again before it is utilized, as in the instances mentioned by Dr. GEORGE JOHNSON and Mr. BALMANNO SQUIRE in other parts of this Journal. In connection with the German Pharmaceutical Association an influential Pharmacopœia Committee has been constituted, consisting of eighteen members, which is presided over by Dr. VULPIUS, one of the acutest critics of the present official work. This Committee will meet once a year at the same time and place as the Association, and provision is made for a meeting to be called at any other time after fourteen days' notice, but the main part of the business will be transacted through the post. The attention of the Committee will first be devoted to certain obscurities in the Latin text of the present edition that have given rise to differences of opinion, and it is proposed in the course of the next twelve months to publish the Committee's interpretations of these passages in the *Archiv der Pharmacie*. The Committee will then proceed systematically to work on the new pharmacopœia, using first the materials in the present one, with which object it will divide itself into eight sections, each taking charge of one-eighth part of the work. It is proposed that the two members in every section shall work out two items every month, and having come to an agreement respecting them shall transmit a report to the President, who will have it hectographed and send a copy to each member of the Committee, by whom it is to be returned within fourteen days with or without remarks and suggestions. If any definite change is desired by a majority of the Committee it will be made, and within another fourteen days the result will be sent to the official journal for publication. In this way an opportunity will be offered to all persons interested for criticism in the trade journals of the conclusions of the Committee respecting each series of articles as the reports appear month by month, and these criticisms, together with the reports upon which they are based, will be available for the consideration of the Government Committee when it commences its labours. It is not proposed to connect the names of members of the Association Committee with the articles upon which they have worked, neither is it intended that the members shall answer any of the outside criticism. In order to enable the Committeee to deal effectively with the subject of new remedies, the President has been instructed to make an appeal to the medical profession, through the German Medical Association, to keep it informed from time to time respecting those new articles of medicines which might appear destined to take a permanent place in the materia medica, and a similar request has also been made to the District-Presidents of the Pharmaceutical Association.

In Queensland a Pharmacy Bill has been brought under the consideration of the Legislature for the fifth time, without, however, much progress having been made. On the last previous occasion the Bill was referred to a Committee, which though cut short in its work by the rising of the House, heard a considerable amount of evidence and sufficient to indicate the nature of the opposition offered to the Bill. One principal objection seems to have been that there were not a sufficient number of competent pharmacists in Queensland to allow of the formation of a proper Pharmacy Board; but a suggestion that the Board might be strengthened by the presence of some medical men was met by the plea that such an arrangement would be *infra dig.* for members of the medical profession. The position was somewhat more definitely defined in an informal protest which the Medical Board presented to the Parliamentary Committee. In this it was stated that the Board considered the present status of chemists and druggists in Brisbane to be far too low for them to undertake the duties specified in the Bill, whilst the existence of two official boards, one medical and another pharmaceutical, would lead to an undesirable antagonism. The Board, therefore, expressed its opinion that it would be far better for one board to preside over the registration and examination of medical men, as well as the registration and education of chemists and druggists, until a Queensland university is established and professional education otherwise provided for. The second reading of the Bill was on the present occasion opposed by the Postmaster-General, but strenuously supported by Dr. O'Doherty, a member of the medical profession. In the course of the discussion it was objected that the Bill would allow of the employment of unqualified practitioners and that it exempted medical assistants and homœopathic chemists from some of its penal provisions. As the Bill stands the first Pharmacy Board would be nominated by the Governor in Council, and it has been proposed that it should consist of the Government analyst, two medical practitioners and four chemists and druggists. The Bill was eventually again referred to a select committee.

* * *

A decision of a court of justice has now been given in the Philadelphia strychnine pill poisoning case, with the result that the drug clerk who was charged with having caused a death through not labelling as "poison" a box of pills made up on a physician's prescription has been discharged, the legal ruling having been entirely in favour of the defendant. The judge held that the law provided for two modes of sale of poison, one on the prescription of a physician and the other on the personal application of a respectable person desiring the poison, and that no good purpose could be served by construing it to require that both modes equally necessitated the use of a "poison label." He was of opinion that the Legislature could never have intended that a medicine dispensed on the prescription of a respectable physician in a case of delicate treatment, in which a poison might be present in proper quantity, should be sent by the pharmacist to the sick room of a nervous patient with the word "poison" on the label, as medical treatment would be ended by such a practice and the power placed in the hands of the pharmacist to destroy the benefit of the physician's remedy. In his opinion the

direction placed on the box, "Use one at meals," indicated plainly the nature and power of the dose, and the smallest amount of prudence or ordinary caution on the part of those who had suffered would have spared them the sickness and death.

* * *

In referring recently to the prevailing tendency to attribute to arsenical impurities any injurious consequences to the skin following the contact of articles dyed with one of the new pigments, we remarked upon the probability that in some cases the action might be due to a property inherent in the compound used. A confirmation of this opinion is found in the report of two cases in each of which the leather inside a straw hat was credited with poisoning the forehead of the wearer and discolouring the hair. The leathers were of a brownish yellow colour and the dye was easily extracted by means of boiling water. Upon a chemical examination the dye proved to be "Victoria yellow," which is, in fact, dinitrocresol—a compound known to be capable of producing poisonous effects.

* * *

In a letter to the *British Medical Journal* (Sept. 27), Dr. L. Aitken, of Rome, denies the correctness of a statement that has been repeated over and over again, namely, that the sanitary state of the neighbourhood of that city has been improved by the planting of eucalyptus trees. Except at Tre Fontane, he says, where the unpaid labour of monks and convicts keeps the trees alive, the experiment of planting the Campagna has proved a costly failure, only three or four per cent of the trees planted under the conditions attending the plantation of other young forest trees having survived. Even at Tre Fontane the Government has found it neccessary to restrict the amount of convict labour which it at first placed at the disposal of the Trappist monks for planting operations, in consequence of the sickness among the warders and convicts. The monks themselves, too, are known still to succumb to malaria, though Dr. Aitken more than hints that the whole truth is not made public, lest it should affect the sale of the eucalyptus elixir which is prepared at the monastery and adds materially to its revenue. Dr. Aitken does not deny that the deaths from severe malarial fevers have decreased during the last year or two, but apart from the fact that this may be due to fluctuations in the intensity of the malarial poison, he is inclined to attribute any slight improvement which may be claimed quite as much to the necessary subsoil draining and preparation of the ground as to any influence of the young gum trees.

* * *

According to an analysis of the Census taken in 1881 there were in all India at that time, among male British born subjects, 321 "Surgeons and Physicians," 30 "Apothecaries, Hospital and Medical Assistants and Students," 2 "Unqualified Practitioners" and 30 "Chemists and Druggists." Among the native population, in the inclusive class of "Physicians, Surgeons and Druggists," there were 113,579 males and 75,239 females.

* * *

The opening meeting of the Chemists' Assistants' Association will be held at the society's rooms, 103, Great Russell Street, on Wednesday next, the 15th inst., when an Inaugural Address will be delivered by the President.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The annual meeting of the thirty-fifth session was held at the Royal Institution, on Thursday evening, September 25, 1884. Mr. Edward Davies, F.C.S., F.I.C., President, in the chair.

The minutes of the last meeting were read and confirmed, and the following donations announced:—

To the Library:—'Proceedings of the Liverpool Philomathic Society from 1828 to 1831,' from the Society; 'Annual Report of the Alumni Association of the Philadelphia College of Pharmacy,' from the Association; 'Proceedings of the Liverpool Naturalists' Field Club, 1883-1884,' from the Club; Various Journals and Papers of the Liverpool Polytechnic Society, from the Society; 'Proceedings of the American Pharmaceutical Association,' from the Association; 'Quarterly Journal of Drugs and Medicines of North America' for April and July, from Mr. A. H. Mason; 'Pharmaceutical Journal,' from the Society; 'Proceedings of the Liverpool Architectural Society,' from the Society.

To the Museum:—Specimen of *Curcuma longa*, grown in Jamaica, presented by R. Sumner and Co.; specimen of *Pyrethrum cinerarifolium*, Ceylon, Gamboge, *Sterculias urens*, Hyderabad, from the Pharmaceutical Society.

Votes of thanks were unanimously accorded to the donors.

The President congratulated the meeting upon the large number of members present, which were more than he remembered at previous annual meetings, and which, he thought, augured well for the success of the ensuing session.

Mr. D. Ferguson and Mr. M. Williams were then unanimously elected Members of the Association.

The Honorary Secretary, Mr. A. H. Samuel, then read the Annual Report of the Council, and the Annual Balance Sheet was submitted by the Honorary Treasurer, Mr. R. M. Sumner.

It was then moved by the President, seconded by Mr. T. F. Abraham, and unanimously resolved:—"That the Reports as read be adopted, and, together with a list of members and abstracts of proceedings of the past session, be printed and circulated amongst the members."

Votes of thanks were passed to the donors to the Library and Museum and to the authors of papers during the past session, and to the officers and Council for their services during the past session.

A ballot was then taken, four members of the Council to fill the places of the four retiring members, the result being the election of Messrs. M. Conroy, C. Symes, J. Woodcock and J. S. Ward.

Mr. T. F. Abraham then moved in accordance with notice:—"That the rules be altered by the substitution of the words 'Chemistry and Pharmacy' for 'Chemical and Pharmaceutical Science,' and the addition of the words 'and the interests of persons engaged in same.'" In introducing the motion he explained fully his reasons, his main object being that it would serve to bring the practice of the Association more in accord with its laws.

Dr. Symes seconded the motion.

Mr. Thos. Williams took objection to the resolution, which he said he should oppose, and said that the meeting had no power to pass the resolution, as it would be acting contrary to law 11, which relegated such resolutions to be guided by the Literary and Scientific Institutions Act.

The President ruled that the meeting would be quite in order in at once discussing and deciding the motion.

The discussion was then continued by Messrs. Conroy, A. C. Abraham, A. H. Samuel, J. S. Ward, and upon being put to the meeting there appeared—for the

motion, 10; against, 5. The motion was therefore declared carried.

Mr. A. C. Abraham then moved:—"That the Council be empowered to alter or add to the laws of the Association (if it should think fit), and, further, that any alterations suggested shall be submitted to an Extraordinary General Meeting for confirmation or otherwise."

This motion was seconded by Dr. Symes.

Mr. Williams raised an objection similar to that he had raised on the previous motion, but was again overruled by the President.

Mr. Conroy opposed the motion, and after some further discussion, the President suggested that, in view of the general feeling of the meeting, Mr. A. C. Abraham should withdraw his motion, with the understanding that the Council at an early opportunity should take into its consideration the whole of the laws of the Association.

Mr. A. C. Abraham said that under these circumstances, and with the consent of the seconder, he would withdraw his motion, and Dr. Symes having concurred, the proceedings terminated.

The British Association for the Advancement of Science.

SECTION B.—CHEMICAL SCIENCE.

Opening Address.

BY PROF. SIR H. ENFIELD ROSCOE, PH.D., LL.D., F.R.S., F.C.S.,

President of the Section.

(*Concluded from p.* 260.)

The discovery of the aniline colours by Perkin, their elaboration by Hofmann, the synthesis of alizarin by Graebe and Liebermann, being the first vegetable colouring matter which has been artificially obtained, the artificial production of indigo by Baeyer, and lastly the preparation, by Fischer, of kairin, a febrifuge as potent as quinine, are some of the well-known recent triumphs of modern synthetical chemistry. And these triumphs, let us remember, have not been obtained by any such "random haphazarding" as yielded results in Priestley's time. In the virgin soil of a century ago, the ground only required to be scratched and the seed thrown in to yield a fruitful crop; now the surface soil has long been exhausted, and the successful cultivator can only obtain results by a deep and thorough preparation, and by a systematic and scientific treatment of his material.

In no department of our science has the progress made been more important than in that concerned with the accurate determination of the numerical, physical and chemical constants, upon the exactitude of which every quantitative chemical operation depends. For the foundation of an accurate knowledge of the first of these constants, viz., the atomic weights of the elements, science is indebted to the indefatigable labours of Berzelius. But "humanum est errare," and even Berzelius's accurate hand and delicate conscientiousness did not preserve him from mistakes, since corrected by other workers. In such determinations it is difficult, if not impossible, always to ascertain the limits of error attaching to the number. The errors may be due in the first place to manipulative faults, in the second to inaccuracy of the methods, or, lastly, to mistaken views as to the composition of the material operated upon; and hence the uniformity of any series of similar determinations gives no guarantee of their truth, the only safe guide being the agreement of determinations made by altogether different methods. The work commenced by Berzelius has been worthily continued by many chemists. Stas and Marignac, bringing work of an almost astronomical accuracy into our science, have ascertained the atomic weights of silver and iodine to within one hundred-thousandth of their value, whilst the numbers for chlorine, bromine, potassium, sodium, nitrogen, sulphur, and oxygen may now be considered correct to within a unit in the fourth figure. Few of the elements, however, boast numbers approaching this degree of accuracy, and many may even still be erroneous from half to a whole unit of hydrogen. And, as Lothar Meyer says, until the greater number of the atomic weights are determined to within one or two tenths of the unit we cannot expect to be able to ascertain the laws which certainly govern these numbers, or to recognize the relations which undoubtedly exist between them and the general chemical and physical properties of the elements. Amongst the most interesting recent additions to our knowledge made in this department we may note the classical experiments, in 1880, of J. W. Mallet on aluminium, and in the same year of J. P. Cooke on antimony, and those, in the present year, of Thorpe on titanium.

Since the date of Berzelius's death to the present day, no discovery in our science has been so far-reaching or led to such unforeseen and remarkable conclusions, as the foundation of Spectrum Analysis by Bunsen and Kirchhoff in 1860.

Independently altogether of the knowledge which has been gained concerning the distribution of the elementary bodies in terrestrial matter, and of the discovery of half-a-dozen new elements by its means, and putting aside for the moment the revelation of a chemistry not bounded by this world, but limitless as the heavens, we find that over and above all these results spectrum analysis offers the means, not otherwise open to us, of obtaining knowledge concerning the atomic and molecular condition of matter.

Let me recall some of the more remarkable conclusions to which the researches of Lockyer, Schuster, Liveing and Dewar, Wüllner, and others in this direction have led. In the first place it is well to bear in mind that a difference of a very marked kind, first distinctly pointed out by Alexander Mitscherlich, is to be observed between the spectrum of an element and that of its compounds, the latter only being seen in cases in which the compound is not dissociated at temperatures necessary to give rise to a glowing gas. Secondly, that these compound spectra—as, for instance, those of the halogen compounds of the alkaline-earth metals—exhibit a certain family likeness, and show signs of systematic variation in the position of the lines, corresponding to changes in the molecular weight of the vibrating system. Still this important subject of the relation of the spectra of different elements is far from being placed on a satisfactory basis, and in spite of the researches of Lecoq de Boisbaudran, Ditte, Troost and Hautefeuille, Ciamician, and others, it cannot be said that as yet definite proof has been given in support of the theory that a causal connection is to be found between the emission spectra of the several elements belonging to allied groups and their atomic weights or other chemical or physical properties. In certain of the single elements, however, the connection between the spectra and the molecular constitution can be traced. In the case of sulphur, for example, three distinct spectra are known. The first of these, a continuous one, is exhibited at temperatures below 500°, when, as we know from Dumas' experiments, the density of the vapour is three times the normal, showing that at this temperature the molecule consists of six atoms. The second spectrum is seen when the temperature is raised to above 1000°, when, as Deville and Troost have shown, the vapour reaches its normal density, and the molecule of sulphur, as with most other gases, contains two atoms, and this is a band spectrum, or one characterized by channelled spaces. Together with this band spectrum, and especially round the negative pole, a spectrum of bright lines is observed. This latter is doubtless due to the vibrations of the single atoms of the dissociated molecule, the existence of traces of a band spectrum demonstrating the fact that in some parts of the discharge the tension of dissociation is insuffi-

cient to prevent the reunion of the atoms to form the molecule.

To this instance of the light thrown on molecular relations by changes in the spectra, others may be added. Thus the low temperature spectrum of channelled spaces, mapped by Schuster and myself, in the case of potassium, corresponds to the molecule of two atoms and to the vapour-density of seventy-nine, as observed by Dewar and Dittmar. Again, both oxygen and nitrogen exhibit two, if not three, distinct spectra; of these the line spectrum seen at the highest temperatures corresponds to the atom; the band spectrum seen at intermediate temperatures represents the molecule of two atoms; whilst that observed at a still lower point would, as in the case of sulphur, indicate the existence of a more complicated molecule, known to us in one instance as ozone.

That this explanation of the cause of these different spectra of an element is the true one, can be verified in a remarkable way. Contrary to the general rule amongst those elements which can readily be volatilized, and with which, therefore, low-temperature spectra can be studied, mercury exhibits but one spectrum, and that one of bright lines, or, according to the preceding theory, a spectrum of atoms. So that, judging from spectroscopic evidence, we infer that the atoms of mercury do not unite to form a molecule, and we should predict that the vapour density of mercury is only half its atomic weight. Such we know, from chemical evidence, is really the case, the molecule of mercury being identical in weight with its atom.

The cases of cadmium and iodine require further elucidation. The molecule of gaseous cadmium, like that of mercury, consists of one atom; probably, therefore, the cadmium spectrum is also distinguished by one set of lines. Again, the molecule of iodine at 1200° separates, as we know from Victor Meyer's researches, into single atoms. Here spectrum analysis may come again to our aid; but, as Schuster remarks, in his report on the spectra of the non metallic elements, a more extensive series of experiments than those already made by Ciamician is required before any definite opinion as to the connection of the different iodine spectra with the molecular condition of the gas can be expressed.

It is not to be wondered at that these relations are only exhibited in the case of a few elements. For most of the metals the vapour-density remains, and probably will remain, an unknown quantity, and therefore the connection between any observed changes in the spectra and the molecular weights must also remain unknown. The remarkable changes which the emission spectrum of a single element—iron, for instance—exhibits have been the subject of much discussion, experimental and otherwise. Of these, the phenomenon of long and short lines is one of the most striking, and the explanation that the long lines are those of low temperature appears to meet the fact satisfactorily, although the effect of dilution, that is, a reduction of the quantity of material undergoing volatilization, is, remarkably enough, the same as that of diminution of temperature. Thus it is possible, by the examination of a spectrum by Lockyer's method to predict the changes which it will undergo, either on alteration of temperature, or by an increase or decrease of quantity. There appears to be no theoretical difficulty in assuming that the relative intensity of the lines may vary when the temperature is altered, and the molecular theory of gases furnishes us with a plausible explanation of the corresponding change when the relative quantities of the luminous elements in a mixture are altered. Lockyer has proposed a different explanation of the facts. According to him, every change of relative intensity means a corresponding change of molecular complexity, and the lines which we see strong near the poles would bear the sames relation to those which are visible throughout the field, as a line spectrum bears to a band spectrum; but then almost every line must be due to a different molecular grouping, a conclusion which is scarcely capable of being upheld without very cogent proof.

The examination of the absorption-spectra of salts, saline and organic liquids, first by Gladstone and afterwards by Bunsen, and by Russell, as well as by Hartley for the ultra-violet, and by Abney and Festing for the infra-red region, have led to interesting results in relation to molecular chemistry. Thus Hartley finds that, in some of the more complicated aromatic compounds, definite absorption bands in the more refrangible region are only produced by substances in which three pairs of carbon atoms are doubly linked, as in the benzene ring, and thus the means of ascertaining this double linkage is given. The most remarkable results obtained by Abney and Festing show that the radical of an organic body is always represented by certain well-marked absorption-bands, differing, however, in position, according as it is linked with hydrogen, a halogen, or with carbon, oxygen, or nitrogen. Indeed, these experimenters go so far as to say that it is highly probable that by this delicate mode of analysis the hypothetical position of any hydrogen which is replaced may be identified, thus pointing out a method of physical orientation of which, if confirmed by other observers, chemists will not be slow to avail themselves. This result, it is interesting to learn, has been rendered more than probable by the recent important researches of Perkin on the connection between the constitution and the optical properties of chemical compounds.

One of the noteworthy features of chemical progress is the interest taken by physicists in fundamental questions of our science. We all remember, in the first place, Sir William Thomson's interesting speculations, founded upon physical phenomena, respecting the probable size of the atom, viz., "that if a drop of water were magnified to the size of the earth the constituent atoms would be larger than small shot, but smaller than cricket balls." Again, Helmholtz, in the Faraday Lecture, delivered in 1881, discusses the relation of electricity and chemical energy, and points out that Faraday's law of electrolysis, and the modern theory of valency, are both expressions of the fact that, when the same quantity of electricity passes through an electrolyte, it always either sets free, or transfers to other combinations, the same number of units of affinity at both electrodes. Helmholtz further argues that, if we accept the Daltonian atomic hypothesis, we cannot avoid the conclusion that electricity, both positive and negative, is divided into elementary portions which behave like atoms of electricity. He also shows that these charges of atomic electricity are enormously large as compared, for example, with the attraction of gravitation between the same atoms; in the case of oxygen and hydrogen, 71,000 billion times larger.

A further subject of interest to chemists is the theory of the vortex-ring constitution of matter thrown out by Sir William Thomson, and lately worked out from a chemical point of view by J. J. Thomson, of Cambridge. He finds that if one such ring be supposed to constitute the most simple form of matter, say the monad hydrogen atom, then two such rings must, on coming into contact with nearly the same velocity, remain enchained together, constituting what we know as the molecule of free hydrogen. So, in like manner, systems containing two, three, and four such rings constitute the dyad, triad, and tetrad atoms. How far this mathematical expression of chemical theory may prove consistent with fact remains to be seen.

Another branch of our science which has recently attracted much experimental attention is that of thermochemistry, a subject upon which in the future the foundation of dynamical chemistry must rest, and one which already proclaims the truth of the great principle of the conservation of energy in all cases of chemical as well as of physical change. But here, although the materials hitherto collected are of very considerable amount and value, the time has not yet arrived for expressing these results in general terms, and we must, therefore, be content to note progress in special lines and wait for the

expansion into wider areas. Reference may, however, be properly made to one interesting observation of general significance. It is well known that, while, in most instances, the act of combination is accompanied by evolution of heat—that is, whilst the potential energy of most combining bodies is greater than that of most compounds—cases occur in which the reverse of this is true, and heat is absorbed in combination. In such cases the compound readily undergoes decomposition, frequently suddenly and with explosion. Acetylene and cyanogen seem to be exceptions to this rule, inasmuch as, whilst their component elements require to have energy added to them in order to enable them to combine, the compounds appear to be very stable bodies. Berthelot has explained this enigma by showing that, just as we may ignite a mass of dynamite without danger, whilst explosion takes place if we agitate the molecules by a detonator, so acetylene and cyanogen burn, as we know, quietly when ignited, but when their molecules are shaken by the detonation of even a minute quantity of fulminate, the constituents fly apart with explosive violence, carbon and hydrogen, or carbon and nitrogen, being set free, and the quantity of heat absorbed in the act of combination being suddenly liberated.

In conclusion, whilst far from proposing even to mention all the important steps by which our science has advanced since the year 1848, I cannot refrain from referring to two more. In the first place, to that discovery, more than foreshadowed by Faraday, of the liquefaction of the so-called permanent gases by Pictet and Cailletet; and secondly, to that of the laws of dissociation, as investigated by Deville. The former, including Andrews's discovery of the critical point, indicates a connection, long unseen, between the liquid and the gaseous states of matter; the latter has opened out entirely fresh fields for research, and has given us new views concerning the stability of chemical compounds of great importance and interest.

Turning for a moment to another topic, we feel that, although science knows no nationalities, it is impossible for those who, like ourselves, exhibit strong national traits, to avoid asking whether we Anglo-Saxons hold our own, as compared with other nations, in the part we have played and are playing in the development of our science. With regard to the past, the names of Boyle, Cavendish, Priestley, Dalton, Black, Davy, are sufficient guarantees that the English have, to say the least, occupied a position second to none in the early annals of chemistry. How has it been in the era which I have attempted to describe? What is the present position of English chemistry, and what its look-out for the future? In endeavouring to make this estimate, I would take the widest ground, including not only the efforts made to extend the boundaries of our science by new discovery, both in the theoretical and applied branches, but also those which have the no less important aims of spreading the knowledge of the subject amongst the people, and of establishing industries dependent on chemical principles by which the human race is benefited. Taking this wide view, I think we may, without hesitation, affirm that the progress which chemistry has made through the energies of the Anglo-Saxon race is not less than that made by any other nation.

In so far as pure science is concerned, I have already given evidence of the not inconsiderable part which English chemists have played in the progress since 1848. We must, however, acknowledge that the number of original chemical papers now published in our language is much smaller than that appearing in the German tongue, and that the activity and devotion displayed in this direction by the heads of German laboratories may well be laid to heart by some of us in England; yet, on the other hand, it must be remembered that the circumstances of different countries are so different that it is by no means clear that we should follow the same lines. Indeed our national characteristics forbid us to do so, and it may be that the bent of the Germanic lies in the assiduous collection of facts, whilst their subsequent elaboration and connection is the natural work of our own race.

As regards the publication of so-called original work by students, and speaking now only for myself as the director of an English chemical laboratory, I feel I am doing the best for the young men who, wishing to become either scientific or industrial chemists, are placed under my charge, in giving them as sound and extensive a foundation in the theory and practice of chemical science as their time and abilities will allow, rather than forcing them prematurely into the preparation of a new series of homologous compounds or the investigation of some special reaction, or of some possible new colouring matter, though such work might doubtless lead to publication. My aim has been to prepare a young man, by a careful and fairly complete general training, to fill with intelligence and success a post either as teacher or industrial chemist, rather than to turn out mere specialists, who, placed under other conditions than those to which they have been accustomed, are unable to get out of the narrow groove in which they have been trained. And this seems a reasonable course, for whilst the market for the pure specialist, as the colour chemist for example, may easily be overstocked, the man of all-round intelligence will always find opportunity for the exercise of his powers. Far, however, from underrating the educational advantages of working at original subjects, I consider this sort of training to be of the highest and best kind, but only useful when founded upon a sound and general basis.

The difficulty which the English teacher of chemistry—and in this I may include Canada and the United States—has to contend against is that, whilst in Germany the value of this high and thorough training is generally admitted, in England a belief in its efficacy is as yet not generally entertained. "The Englishman," to quote from the recent Report of the Royal Commission on Technical Instruction, "is accustomed to seek for an immediate return, and has yet to learn that an extended and systematic education, up to and including the methods of original research, is now a necessary preliminary to the fullest development of industry, and it is to the gradual but sure growth of public opinion in this direction that we must look for the means of securing to this country in the future, as in the past, the highest position as an industrial nation."

If, in the second place, we consider the influence which Englishmen have exerted on the teaching of our science, we shall feel reason for satisfaction; many of our text-books are translated into every European language and largely used abroad; often to the exclusion of those written by Continental chemists.

Again, science teaching, both practical and theoretical, in our elementary and many secondary schools, is certainly not inferior to that in schools of similar grade abroad, and the interest in and desire for scientific training is rapidly spreading throughout our working population, and is even now as great as, if not greater than abroad. The universities and higher colleges are also moving to take their share of the work which has hitherto been far less completely done in our country than on the continent of Europe, especially in Germany, where the healthful spirit of competition, fostered by the numerous State-supported institutions, is much more common than with us, and, being of equal value in educational as in professional or commercial matters, has had its due effect.

Turning lastly to the practical applications of our science, in what department does England not excel? and in which has she not made the most important new departures? Even in colour chemistry, concerning which we have heard, with truth, much of German supremacy,

we must remember that the industry is originally an English one, as the names of Pekin and of Maule, Simpson and Nicholson, testify; and if we have hitherto been beaten hollow in the development of this branch, signs are not wanting that this may not always be the case. But take any other branch of applied chemistry, the alkali trade for instance, what names but English, with the two great exceptions of Leblanc and Solvay, do we find in connection with real discoveries? In the applica- of chemistry to metallurgical processes, too, the names of Darby, Cort, Neilson, and Bell, in iron, of Bessemer, Thomas, Gilchrist and Snelus, in steel, of Elkington and Matthey in the noble metals, show that in these branches the discoveries which have revolutionized processes have been made by Englishmen; whilst Young, the father of paraffin, Spence, the alum-maker, and Abel, of gun-cotton fame, are some amongst many of our countrymen whose names may be honourably mentioned as having founded new chemical industries.

Hence, whilst there is much to stimulate us to action in the energy and zeal shown by our Continental brethren in the pursuit both of pure and applied chemistry, there is nothing to lead us to think that the chemistry of the English-speaking nations in the next fifty years will be less worthy than that of the past half-century of standing side by side with that of her friendly rivals elsewhere.

American Pharmaceutical Association.

Hydrastine.*

BY PROFESSOR FREDERICK B. POWER, PH.D.

The alkaloid hydrastine was observed by Durand,† of Philadelphia, as early as 1851, but, although its alkaline nature was noticed, he did not succeed in preparing it in a pure state. It was afterwards more closely examined by J. D. Perrins,‡ of Worcester, England, in 1862, who first separated it from *Hydrastis canadensis* in a relatively pure form, and described some of its reactions, but did not institute an elementary analysis. The following year it was analysed and some of its other properties noticed by F. Mahla,§ of Chicago, who assigned to it the empirical formula $C_{22}H_{24}NO_6$. From Mahla's analytical results the formula $C_{22}H_{23}NO_6$ has been deduced by Kraut, and this has since been generally accepted.

The investigation undertaken by me had primarily for its object the verification of the empirical formula of the alkaloid and the determination of its crystalline form, but, as opportunity permitted, was afterwards considerably extended in its scope.

The alkaloid which was employed for the present investigation was kindly prepared for me by Professor J. U. Lloyd, of Cincinnati, and represented a substance of rare purity, having been precipitated and crystallized about thirty consecutive times. To the kindness and liberality of Professor Lloyd I am also indebted for the method employed by him in the preparation of the alkaloid, which is as follows:—

Process of Manufacture.—One thousand pounds of powdered *Hydrastis canadensis* were properly moistened with alcohol, packed in a suitable percolator, and percolation then conducted with the use of officinal alcohol as a menstruum. Sulphuric acid, in excess, was added to the percolate, and, after four hours, the supernatant liquid filtered from the mass of crystals of sulphate of berberine ($C_{20}H_{17}NO_4.H_2SO_4$). To this filtrate ammonia-water was added until it showed but a slightly acid reaction, then strained to separate the precipitated sulphate of ammonium, distilled to a syrupy consistence, and the residue poured into ten times its bulk of cold water. After twenty-four hours the precipitated resinous substances, oils, etc., were separated from the liquid by filtration, the filtrate being an impure solution of sulphate of hydrastine. Ammonia-water, in decided excess, was then added to this resultant liquid, and the precipitate of impure hydrastine collected and dried. It was then digested with one hundred times its weight of cold water, to which sulphuric acid was carefully added to *slight* acid reaction, and, after twenty-four hours, filtered. The filtrate was again precipitated with excess of ammonia-water, the precipitate collected on a strainer and dried. This precipitate was powdered and extracted with boiling alcohol, from which impure, dark-yellow crystals of hydrastine separated when the alcoholic solution was cooled. The crystals were purified by repeated crystallization from boiling alcohol. In order to obtain the hydrastine perfectly colourless, when in the form of large crystals, many crystallizations are necessary. Small crystals appear to be white, when in reality they are considerably coloured, which is partly due to the fact that they are prone to become opaque from the presence of numerous fractures.

Crystalline Form.—For the determination of the crystalline form of the alkaloid some carefully selected and handsomely developed crystals were also furnished me by Professor Lloyd. By the crystallization of relatively small amounts, the faces of the crystals are rarely, if ever, perfectly developed, and, even when operating upon larger quantities, this is also frequently the case, from the fact that the crystals almost invariably form with their lateral surfaces attached to the sides of the crystallizing vessel.

The crystals, which attain a maximum length of from eight to ten millimetres, have the form of four-sided prisms, and apparently belong to the orthorhombic system. In the drawings presented, which represent typical crystals, were formed by making an orthographic projection, and the angles may be said to be as geometrically accurate as it is possible to obtain them without absolute measurements. In the terminal faces some are very perfectly developed, while in others the terminal faces are not so symmetrically developed, and therefore have a somewhat more complicated form. It is interesting to observe that when both ends of the crystals are developed, the corresponding terminal faces of opposite ends are invariably inclined to each other at an angle of exactly 90°.

Physical Properties.—The crystals of hydrastine are anhydrous, and, when pure, perfectly colourless and very brilliant. They fuse at 132° C. (Mahla, *loc. cit.*, states 135° C.), to a light amber-coloured liquid. When heated on platinum foil they decompose with the evolution of empyreumatic, inflammable vapours, reminding, as Mahla had previously observed, somewhat of carbolic acid, and leaving a large amount of ash, which burns slowly away at a red heat.

Hydrastine is insoluble in water and in petroleum benzine, these liquids leaving, after prolonged contact with the alkaloid, no perceptible residue upon evaporation, and the aqueous liquid is not affected by potassio-mercuric iodide; it is soluble, however, in dilute acids and in chloroform, benzol, ether and alcohol.

The degree of solubility in the four latter liquids was determined by digesting the alkaloid with the solvent in closed tubes for several days, at a temperature of 15° C., with frequent agitation, filtering into tubes provided with tightly-fitting stoppers, and, after weighing, evaporating to dryness, and finally drying the product at 100° C. The relative solubility is then calculated by the formula $\frac{a-b}{b}$, where a represents the amount of solution employed, and b the amount of residue left upon evaporation. 4·858 grams of the chloroform solution gave 1·765 gram of alkaloid; 5·688 grams of benzol solution gave 0·340 gram; 5·068 grams of ether solution gave 0·060 gram; and 4·487 grams of alcohol solu-

* From the *Pharmaceutical Record*, September 10, 1884.
† *Amer. Journ. Pharm.*, xxiii., 112.
‡ *Pharm. Journ. Trans*, [2], iii., 546.
§ *Silliman's Amer. Journ.*, vol. 36, cvi., 57.

tion gave 0·037 gram of alkaloid. One part of alkaloid is therefore soluble in 1·75 part of chloroform, in 15·70 parts of benzol, in 83·46 parts of ether, and in 120·27 parts of alcohol. It is naturally much more freely soluble in these liquids when hot, but to what extent I did not attempt to determine.

Through the kindness of Professor Flückiger, of Strasburg, I have ascertained the action of hydrastine upon polarized light, as determined by the polaristrobometer of Wild. Ten parts of the alkaloid dissolved in 97 parts of chloroform, deviate the polarized ray, in sodium light, with a column of 100 millimetres, $-17°$; with a column of 50 millimetres, $-8°{\cdot}5$. From these data I have calculated the *specific rotation* to be $(a)_D = -170°$, as deduced from the following formula:—

$$(a)_D = \frac{aV}{lK},$$

where a = the angle of rotation in sodium light, or $-17°$.
V = the volume of liquid, or 100 c.c.
l = the length of the applied column of liquid, expressed in decimetres, or 1.
K = the weighed amount of substance, or 10 grams, or

$$(a)_D = \frac{100a}{l.\ c.},$$

where c represents the number of grams of substance in 100 c.c. of solution, or 10.

From the *specific* rotation the *molecular* rotation may then be calculated according to the formula of Krecké, which expresses the angle of rotation effected by an equal number of molecules in unity of volume when a ray of light passes through a layer of 1 millimetre in thickness

$$[M] = \frac{P[a]}{100};$$

$$[M] = -674°{\cdot}9,$$

where P represents the molecular weight of hydrastine, or $C_{22}H_{23}NO_6 = 397$, and $[a]$ its specific rotation, or $-170°$.

Chemical Examination and Analysis.—The crystals of hydrastine are affected in the following manner by reagents:—

Concentrated sulphuric acid produces a yellow colour, which, in contact with a crystal of potassium bichromate, becomes brown.

Concentrated sulphuric acid, on warming, produces a bright red colour.

Concentrated nitric acid produces, in the cold, a yellow colour, changing to reddish yellow.

Concentrated hydrochloric acid gives no coloration, either in the cold or upon warming.

Concentrated sulphuric acid and molybdate of ammonium gives an olive-green colour, which appears to be its most characteristic test.

The solution of the hydrochlorate is affected as follows by reagents:—

Ammonia-water and the fixed alkalies give a white, curdy precipitate, sparingly soluble in excess; potassium iodide, potassio-mercuric iodide, potassium ferrocyanide, potassium sulphocyanide, mercuric chloride, and tannic acid produce white precipitates; iodine in potassium iodide, a light brown precipitate; potassium bichromate, a yellow precipitate; picric acid, a bright yellow precipitate; platinic chloride, an orange-yellow precipitate; auric chloride, a deep yellowish-red precipitate.

The ultimate analysis of the alkaloid was performed by its combustion with oxide of copper, in a tube provided with a glowing copper spiral. 0·2600 gram of hydrastine gave 0·6360 gram $CO_2 = 66{\cdot}69$ per cent. C., and 0·1315 gram $H_2O = 5{\cdot}61$ per cent. H.

Since Mahla estimated the nitrogen by burning with soda-lime, and subsequently converting the ammonia into the platinum double salt, it is therefore of interest to compare the result which I have obtained by Dumas' method, by the direct estimation of the volume of nitrogen gas.

0·648 gram of hydrastine when burned with oxide of copper in an atmosphere of CO_2, and the gas led over a glowing copper spiral, afforded 21 c.c. of nitrogen. The percentage is then calculated according to the following formula:—

$$G = \frac{V}{1 + 0{\cdot}00367t} \cdot \frac{B - f}{760} \cdot 0{\cdot}001256,$$

where G = the weight of nitrogen sought.
V = the observed volume of gas in cubic centimetres, or 16.
0·00367 = the coefficient of expansion of the gas for each degree centigrade.
t = the temperature of the gas, or 16° C.
f = the tension of aqueous vapour at the temperature t, or 13·536 millimetres.
B = the barometric pressure, or 737·2 millimetres.
0·001256 = the weight of one cubic centimetre of nitrogen, expressed in grams, at 0° C. and under 760 mm. pressure.

G is then equal to 3·46.

Calculated for $C_{22}H_{23}NO_6$.	Found. Power.	Found. Mahla.	
C = 66·48 per cent.	66·69 per cent.	66·69	66·38
H = 5·79 per cent.	5·61 per cent.	6·01	5·69
N = 3·53 per cent.	3·46 per cent.	3·83	3·76
O = 24·20 per cent.	—	—	—
100			

The results of both our analyses are seen to agree quite closely with the accepted formula, which may therefore now be presumed to be correct. It is also quite evident that there is no simple relationship between hydrastine and the alkaloid berberine, $C_{20}H_{17}NO_4$, such as exists, *e.g.*, between the associate alkaloids, morphine and codeine, or caffeine and theobromine.

Mahla prepared the *hydrochlorate of hydrastine*, and obtained it in the form of an uncrystallizable, white, gum-like substance, which can readily be powdered, and is easily soluble both in water and alcohol. This salt was found to contain 8·46 per cent. HCl, and has therefore the formula $C_{22}H_{23}NO_6.HCl$, which requires 8·42 per cent. HCl.

From the hydrochlorate Mahla prepared and analysed the *platinum double salt*, and obtained therefrom 16·17 per cent. of platinum. This salt has therefore the formula $(C_{22}H_{23}NO_6.HCl_2) + PtCl_4$, which requires 16·15 per cent. of platinum.

An analysis of both of these salts, prepared by myself, confirms the correctness of these results, and need not therefore be repeated.

Since, however, the sulphate and the gold double salt have not to my knowledge hitherto been analysed, I have prepared and analysed both of these. The *sulphate of hydrastine* is amorphous* and of a light brownish colour, but affords a nearly white powder. For analysis it was dried at 100° C. 1·0625 gram of the sulphate gave 0·2916 gram $BaSO_4 = 0{\cdot}1227$ H_2SO_4, or 11·54 per cent. The formula $(C_{22}H_{23}NO_6)\ H_2SO_4$ requires 10·98 per cent. H_2SO_4.

The *gold double salt* was prepared from the hydrochlorate by precipitation with auric chloride. It is of a deep yellowish-red colour, quite hygroscopic, and fuses at the temperature of the water-bath to a reddish liquid, which, upon cooling, becomes brittle and resinous in appearance.

0·3310 gram of hydrastine-gold chloride, dried at 100° C., gave 0·0560 gram of metallic gold, or 16·92 per cent.

* It may be stated that the *crystallized* sulphate of hydrastine advertised by some manufacturers is simply the acid sulphate of the yellow alkaloid berberine,

$$C_{20}H_{17}NO_4.H_2SO_4,$$

to which the name hydrastine is persistently misapplied.

The formula $(C_{22}H_{23}NO_6.HCl_2)AuCl_3$ requires 16·78 per cent. of gold. I attempted to prepared the *nitrate* by dissolving the alkaloid in warm dilute nitric acid, but as decomposition appeared to ensue, it was afterwards formed by the decomposition of the sulphate with barium nitrate. As obtained in this way the salt was found to be uncrystallizable, resembling in appearance the sulphate and hydrochlorate.

The *acetate* may readily be prepared in solution by dissolving the alkaloid in acetic acid, but upon evaporation, even with an excess of acid, it finally becomes decomposed, with the separation of the alkaloid.

With the hope that some of the salts of hydrastine with the organic acids might be crystallizable, weighed portions of the alkaloid were dissolved in warm alcohol and mixed with alcoholic solutions of citric, tartaric, oxalic, salicylic, and benzoic acids respectively, in the proper theoretical proportions. The solutions after admixture retained a slightly acid reaction, and, after standing for some time, well developed crystals were separated, differing in each case in appearance according to the acid employed, but upon examination they were found to be insoluble in water, either hot or cold, and to consist simply of the pure alkaloid. I then attempted to prepare the citrate and tartrate by adding to the warm alcoholic solutions of hydrastine aqueous solutions of citric and tartaric acids, in the proper molecular proportions to form neutral salts, but upon the evaporation of such solutions the alkaloid again became separated. The conclusion may therefore be drawn from these experiments that hydrastine is not only a very weak base, but also incapable of forming any crystallizable simple salts.

After these experiments had been made, a commercial preparation termed "soluble citrate of hydrastine" was brought to my notice, which was examined with the following result:—It is a light yellowish-grey amorphous powder, readily soluble in water, with the exception of a small amount of resinous matter, and affording, after filtration, a bright pale-yellowish solution having a strongly acid reaction. The amount of pure alkaloid which it contained was determined by precipitating the aqueous solution with ammonia water, in slight excess, and extracting the alkaloid with successive portions of chloroform until the aqueous liquid, after acidulation, was no longer affected by potassio-mercuric iodide. 0·9160 gram of the salt, dried at 100° C., afforded 0·1025 gram of hydrastine, or 11·19 per cent. This would correspond to the proportion of 1 molecule of alkaloid to 15 molecules of citric acid, or one part by weight of alkaloid to 8 parts of acid = 11·19 per cent.

$$\underbrace{C_{22}H_{23}NO_6}_{397} : \underbrace{15\,C_6H_8O_7.H_2O}_{3150} = 1 : 8$$

A neutral salt $(C_{22}H_{23}NO_6)_3\,C_6H_8O_7 + H_2O$, would require the proportion of about 5 parts of alkaloid to 1 part of acid. The permanence and solubility of this commercial preparation is therefore easily explained by the very large excess of citric acid employed.

In order to ascertain whether hydrastine is capable of yielding a hydro compound, 5 grams of the alkaloid were dissolved in dilute sulphuric acid, and subjected for about two days to the action of the nascent hydrogen, as developed from metallic zinc and platinum. The liquid was then filtered, precipitated by ammonia-water, in slight excess, and the precipitate, after washing, dissolved in hot alcohol and allowed to crystallize. The crystals are insoluble in water and closely resemble in appearance those of hydrastine, but possess a slightly yellowish tint which could not be removed by repeated crystallization. The melting point also lies close to that of hydrastine, being observed at 131° C. I have not as yet subjected these crystals to ultimate analysis, but have formed therefrom and analysed the hydrochlorate. The latter, like the hydrochlorate of hydrastine, is amorphous, and remains, by the evaporation of its solution, in the form of a transparent, yellowish varnish, yielding, however, a nearly white powder freely soluble in water. After drying at 100° C, 0·7830 gram of substance gave 0·2560 gram AgCl = 0·0651 gram HCl, or 8·31 per cent.

This result would therefore indicate that a *hydrohydrastine* is thereby formed, by the absorption of four atoms of hydrogen, and is analogous in composition to hydro-berberine, $C_{20}H_{21}NO_4$ (*Ann. Chem. Pharm.*, Suppl., 2, 191).

Calculated for $C_{22}H_{27}NO_6HCl$.

HCl = 8·34 per cent.

Found.

8·31 per cent.

With iodine and bromine, hydrastine also enters into combination, which is best effected by the use of chloroform solutions; but the products of this reaction, which, in the case of bromine, is attended by the development of considerable heat, I have not yet further examined. The iodine compound has been obtained in a crystalline form.

Since Mahla has stated (*loc. cit.*) that hydrastine is not affected by a dilute solution of potassa, even by prolonged boiling therewith, I have not repeated this experiment, but its decomposition by fusing with potassium hydroxide has afforded me products of considerable interest.

Ten grams of the alkaloid, reduced to powder, were brought into about four times its weight of fusing potassium hydroxide, contained in a silver dish, when a considerable amount of unpleasant, inflammable vapours were evolved and the mass assumed a uniform yellowish-brown colour. This was dissolved in water, dilute sulphuric acid in slight excess added, and the liquid distilled. In the distillate formic acid was detected. The residual acid liquid contained in the flask was then shaken with ether, the ethereal liquid separated and allowed to evaporate, when a considerable amount of a crystalline acid was obtained, corresponding in all of its reactions to protocatechuic acid $C_7H_6O_4$. Thus its aqueous solution, even when very dilute, affords with ferric chloride a deep bluish-green colour, and upon the subsequent addition of a very small quantity of a highly dilute solution of sodium carbonate a beautiful blue colour is produced. No other acids appear to be formed by this reaction. It may be stated, however, that protocatechuic acid is likewise formed, under the same circumstances, from the alkaloid berberine, as well as from many other substances.

In order to determine, if possible, with which class of organic bases hydrastine may be grouped, whether primary, secondary, or tertiary, it was subjected to the action of ethyl iodide. Ten grams of the alkaloid, in alcoholic solution, were heated for several hours with 20 grams of freshly prepared ethyl iodide on a water-bath, in a flask provided with an inverted condenser. In the beginning of the operation a considerable amount of hydriodic acid was evolved. The liquid contained in the flask, after heating for several hours, was of a yellowish colour, and no longer separated any crystals upon cooling. Upon the evaporation of the liquid a deep reddish-yellow syrup was obtained, which, upon being treated with alcohol, separated a considerable amount of white crystalline powder. This was collected on a filter, washed with a little alcohol, and being observed to be quite freely soluble in water, it was disolved in the latter. From the warm aqueous solution it separates, upon cooling, in small, nearly colourless, crystalline scales. The alcoholic liquid obtained from the first separation of the crystals was of a reddish-yellow colour, and was allowed to evaporate nearly to dryness. This residue was then treated with boiling water, which completely dissolved it, but upon evaporation an amorphous residue was again obtained. Upon treating this, however, again with alcohol, an amorphons dark-coloured substance became dissolved, leaving an additional amount

of a purely white salt, which was afterwards purified by crystallization from hot water. The crystals are anhydrous and fuse at about 183° C., but become decomposed at a considerably lower temperature. After drying at 100° C., the salt was analysed with the following result:—

I. 0·7480 gram of the salt gave 0·3280 gram AgI = 0·1786 gram HI, or 23·80 per cent.

II. 0·3075 gram of the salt gave 0·1320 gram AgI = 0·0719 gram HI, or 23·38 per cent.

Calculated for $C_{22}H_{22}(C_2H_5)NO_6HI$.

HI = 23·14 per cent.

Found.

I.	II.
23·87 per cent.	23·38 per cent.

This crystalline compound is therefore evidently the *hydriodate of ethyl-hydrastine*, formed by the substitution of one atom of hydrogen by the ethyl radical, and hydrastine may be considered, with a considerable degree of probability, as a secondary or imide base. In this respect according to Henry* and Bernheimer,† it occupies an analogous position to berberine, since they obtained from the latter mono-ethyl and methyl derivatives, while, according to Perrins and Schmidt,‡ in the case of berberine, the simple hydriodate of the base is thereby formed.

That the crystalline compound obtained from hydrastine is really an ethyl derivative is evident not only from the analysis, but I have also prepared the simple hydriodate by dissolving the alkaloid in freshly prepared hydriodic acid. As thus obtained it is an amorphous substance and very easily decomposed.

In concluding this investigation a few words may be said regarding the supposed third alkaloid of *Hydrastis canadensis*, the so-called *xanthopuccine*. The presence of such an alkaloid was first intimated by A. K. Hale,§ afterwards confirmed by John C. Burt,‖ and finally by Herman Lerchen,¶ who endowed it with a name. The very peculiar properties, for an alkaloid, which were ascribed to this substance by Mr. Burt would render it extremely interesting, since he states (*loc. cit.*, p. 482) that "the hydrochlorate solution gave with ferric chloride a dark brown to black solution, and with potassium ferrocyanide a greenish-blue solution, while the fact of its precipitating lead acetate is not quite so remarkable, in view of the sparing solubility of lead chloride."

With a desire to examine this substance more carefully, I applied to Professor Lloyd for a specimen of it, and was not greatly surprised to learn from him that in working upon thousands of pounds of hydrastis he had never been able to obtain it.

* *Ann. Chem. Pharm.*, cxv., p. 132.
† *Gaz. Chim. Ital.*, xiii., pp. 329—342.
‡ *Ber. der. deutsch. Chem. Ges.*, 1883, p. 2589.
§ *Amer. Journ. Pharm.*, 1873, p. 247.
‖ *Ibid.*, 1875, p. 481.
¶ *Ibid.*, 1878, p, 470.

Parliamentary and Law Proceedings.

The Sale of Arsenic.

At the Louth Borough Police Court, on Friday, October 3, Mr. Mark Smith appeared in answer to a summons charging him with selling to Charles Fowler certain uncoloured arsenic less than ten pounds, to wit one pound, on the 24th ult.

The defendent admitted the offence but said in explanation that it was the custom of the trade to sell uncoloured arsenic to the farmers and other customers, as for sheep dipping and some other purposes the colouring of arsenic is detrimental to it. If a customer could not get it in one place he could in another. The law was frequently evaded in this way. If customers applied for one or two pounds, and were told they must take ten pounds, they say "Well, enter me ten pounds and I will get it as I want it." The law was faulty, but of course it must be observed. Finding afterwards that the arsenic had been objected to by the police he sent for it back and coloured it. It was invariably the custom of the trade.

The Magistrates after retiring to consider their decision, inflicted a nominal fine of £1 and 9*s.* 6*d.* costs, but they wished it it to be understood that in any future cases they would take a more severe course.—*Louth and North Lincolnshire Advertiser.*

BOOK RECEIVED.

Notes on Materia Medica and Pharmacy. By Frederick T. Roberts, M.D., etc. London: H. K Lewis. From the Publisher.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Permanganate of Potash Pills.

Sir,—Mr. Ryley's suggestion that the varnish I used for the cera flava pills is insoluble is hardly carried out by the last paragraph of my letter, in which I wrote that: "Pills made with the vaseline excipient treated the same way disintegrated in two hours and a half."

The varnish used was the ordinary sandarach one made with absolute alcohol. I always use it to such pills as require protection from the atmosphere, and thought the custom would be general.

I have carefully tested the uncoated pills Mr. Ryley sent me, and, taking them from their size to have been two-grain ones, I find that two-fifths ($\frac{2}{5}$) of the permanganate has suffered alteration, as might be expected. Mr. Ryley's remarks concerning pil. phosphori, B.P., supply another argument in favour of a new pharmacopœia, the insolubility of the B.P. form having been settled, I believe, ten years ago.

Oldham. A. E. Martin.

Unstamped Weights and Measures.—"*A North London M.P.S.*," who has within the last few days been informed by the inspector of weights that he has "no right to be in possession of any weight or measure unstamped, even if accurate," nor to "hoard up a short weight or broken measure," is desirous of publishing the warning, believing that there are hundreds of chemists and druggists liable to condemnation through ignorance of the law. We may add that the Act is very explicit on this point. Section 25 provides that any person who uses or has in his possession for use in trade a weight or measure that is false or unjust shall be liable for a first offence to pay a fine of five pounds, and section 29 imposes a similar penalty on any person using or having in his possession for use in trade an unstamped weight or measure. It is true that the sections apply particularly only to weights and measures used for trade purposes, but the onus would lie upon a defendant of proving that any impounded weights or measures were not so used, which might be a very difficult task. The subject of the inconvenience that may arise from being in possession of unstamped weights and measures has been so repeatedly brought under the notice of chemists and druggists since the passing of the Act that the plea of ignorance would hardly be likely now to be of much avail.

T. A. R.—Proctor's 'Lectures on Practical Pharmacy.'

Communications, Letters, etc., have been received from Dr. Landerer, Messrs. Heindl, Richardson, Dyer, Pondo.

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7.—**Compound Camphor or Voice.**
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Dose: from 5 to 10 daily.

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Kay's New Transparent Cement for Broken Articles.

KAY'S COMPOUND ESSENCE

Of LINSEED, ANISEED, SENEGA, SQUILL, TOLU, &c. (with Chlorodyne).

"The Stockport Remedy" for Coughs and Colds.

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IMPROVED CUE TIP FIXER.

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KAY'S TUBES for Feeding Bottles, with patent glass valve. Fit all bottles, and prevent children sucking air.

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SAPO-LINI, a Saponified Linseed Jelly; an excellent Toilet Soap.

All articles containing Scheduled Poisons are so labelled.

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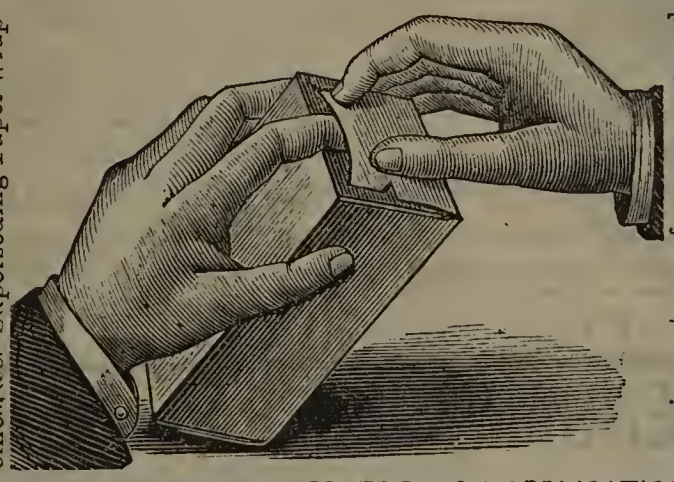
Patent FOLDING CARDBOARD BOXES

Specially suitable and highly recommended for packing up Proprietary Goods, Cereals, Foods, Patent Medicines, &c. Superseding Paper Wrappers in neatness of appearance and strength, and therefore affording great protection to bottles, &c.



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HOGE'S HOREHOUND HONEY

FOR THE PROMPT RELIEF OF CHEST COMPLAINTS, COUGHS, AND SORE THROATS.

SUPPLIED BY ALL CHEMISTS.

The popularity of this natural and strongly medicinal remedy is not due to advertising so much as to its own inherent virtues. It is gathered by the honey bees from the horehound honey blossoms.

The following Testimonials are not from obscure and unknown people, but from some of the leading and best known in the kingdom. No medicine introduced to the public has ever deserved and received such patronage and success.

HAWTHORN LODGE, FINCHLEY NEW ROAD, N.W.,
Messrs. W. M. HOGE & Co., London. *March* 30, 1883.

Gentlemen,—I have much pleasure in stating that I consider your "Horchound Honey" the most wonderful remedy I have ever tried, possessing properties which are nothing short of marvellous for the cure of affections of the throat and chest. I shall never be without a bottle of "Horehound Honey."

Yours very truly, MARIE ROZE.

Your "Honey" is delicious. ELLEN TERRY.

The Lord Mayor of London orders it.

MANSION HOUSE, LONDON, E.C., *September* 28, 1883.

The LORD MAYOR would thank Messrs. W. M. HOGE & Co. to send him half a dozen of their "HOGE'S Horehound Honey," which has been *well recommended* to him.

W. L. BRIGHT, Esq., son of the Right Hon. JOHN BRIGHT, M.P., says "HOGE'S Horehound Honey" CURED his father of a bad cough.

What the Clergy say of it.

ELY, CAMBS., *May*, 1883.

The Rev. C. D. KINGDON has great pleasure in bearing testimony to the excellent properties of "HOGE'S Horehound Honey" for preaching. It makes the voice clear and pleasant, and takes away all that huskiness in the throat which is so uncomfortable to preacher and congregation.

From the Champion Billiard Player.

38, MARYLANDS ROAD, WESTBOURNE PARK,
Messrs. W. M. HOGE & Co. *Oct.* 27, 1883.

Gentlemen,—I have much pleasure in certifying to the excellence of your "Horehound Honey." I have found great relief from taking it, and strongly recommend it for coughs.

Yours faithfully, JOHN ROBERTS, Jun.

What it did for Geo. F. Black, Esq.

7, SUFFOLK LANE, CANNON STREET, E.C.,
Messrs. W. M. HOGE & Co., London. *London, April* 20, 1883.

Gentlemen,—Having suffered for many years with irritation of the throat and chest, I never found any remedy to relieve the irritation until I purchased a bottle of your "Horehound Honey," which I did a few days since. I want to inform you it had a wonderful soothing effect, affording relief at once. Please send me one dozen bottles, and oblige yours truly, G. F. BLACK.

Price 1s. 1½d. per Bottle. { *To be had of any Chemist.*

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HOGE'S HONEY COMPANY (Limited)

12, GT. EASTERN STREET, LONDON, E.C.

Great Saving in the purchase

of New Medical Dispensing Bottles and Phials at the Islington Glass Bottle Company (H. HARRIS & CO., Proprietors), 153, Upper Thames Street, City, London, E.C.

Before ordering the above see our newly Reduced Price List, which is forwarded free on application; also for Blue Poison Bottles, Round Shouldered Phials, Castor Oil Bottles, Flat Pannelled Bottles, Direct Square Dispensing Bottles, Citrate of Magnesia, Essence Bottles, Pomade Bottles, and all other kinds.

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Now largely used in perfumery as a substitute for the Mitcham Oil. *Price* 21s. *per lb.* of

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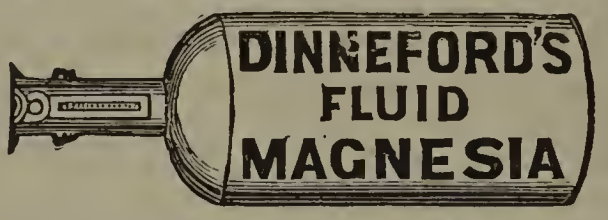

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Perfect in Purity and uniform in Strength.

"Dinneford's Solution may fairly be taken as a type of what the preparation ought to be."—*Pharmaceutical Journal.*

Sold by all Wholesale Druggists, and by the Manufacturers,

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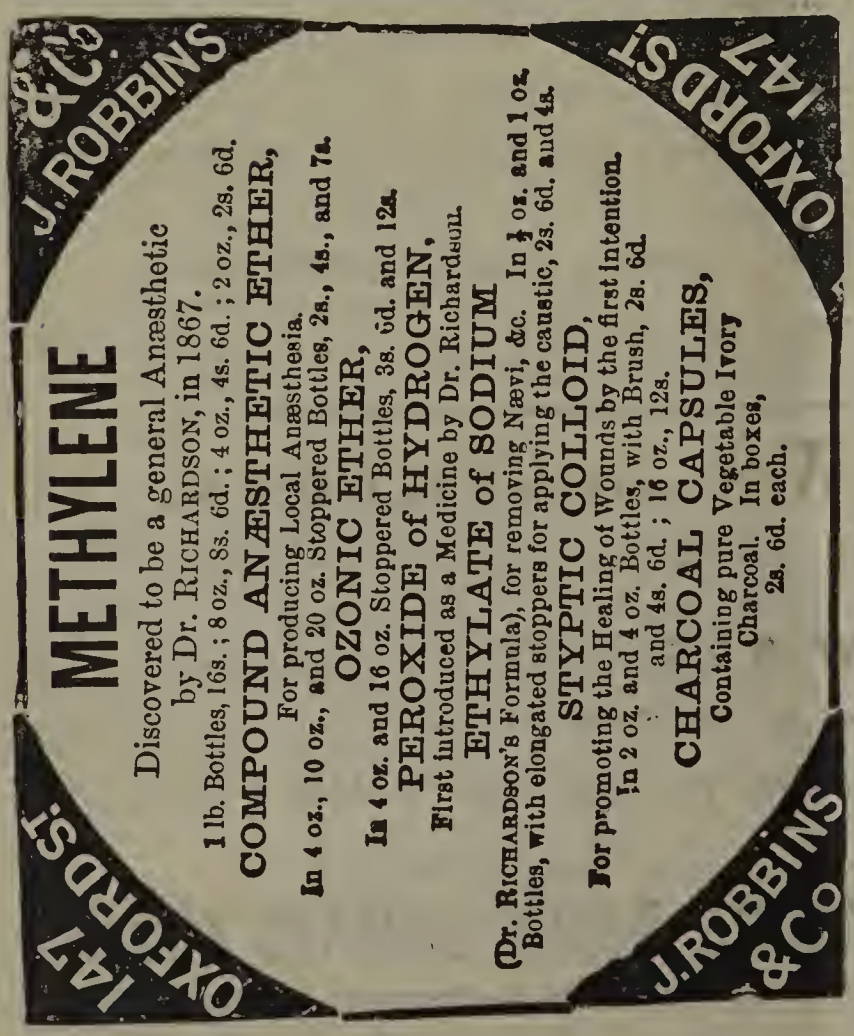

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BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—
AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

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SPECIALITÉ BOXES.
The lid removes, and the box serves as a holder for the Cone.

REDUCED PRICES:

The Wooden Barrels	7/-	per doz.
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The Plain Willow do.	3/6	,,
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ASK FOR THE
PURE MENTHOL CONES
(CHRISTY'S BRAND),
Exempt under the Medicine Acts.

Show Cards and Counter Bills on application.

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These Preparations received a FIRST-CLASS AWARD (the Highest Obtainable), at the INTERNATIONAL MEDICAL AND SANITARY EXHIBITION, SOUTH KENSINGTON.

LIQUOR PANCREATICUS (BENGER)—For the Preparation of Peptonised or Artificially Digested Food. Bottles, 2s. 6d., 4s. 6d., and 8s. 6d., with full directions.

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Of all leading Wholesale and Retail houses.

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MOTTERSHEAD & CO. Pharmaceutical Chemists,
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GOLD MEDAL, BOSTON EXHIBITION, 1883.

SIR JAMES MURRAY'S
PURE
FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of

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Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

His **FLUID CAMPHOR** is a valuable remedy for Sleeplessness and Weak Nerves.
Bottles, 1s. and 2s. each.

PURE SPIRITS OF WINE.

TO WHOLESALE DRUGGISTS, CHEMISTS, PERFUMERS, &c.

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Are now supplying *Sp. Vin. Rect.*, extra and first qualities, at a very low figure for cash; free from smell, and perfectly clean; for exportation likewise.

METHYLATED SPIRIT AND FINISH,
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We are selling the above at the lowest possible cash price of the day, in quantities of Five Gallons and upwards. Quotations upon application.

NAPHTHA at current market rate.

CATALONIAN SHERRY

7*s.* 6*d.* per gallon. A good sound wine, combining body and strength, and specially adapted for medicated wines and other purposes.

ORANGE WINE, finest quality; guaranteed not to cause a deposit or become opaque by the addition of quinine. 6*s.* per gallon, net. cash.

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Is used by all the principal Wholesale Druggists, Pharmaceutists and Perfumers in town and country (54° to 65°), and will bear testing with Ammonia. It is allowed to be the best article out for making Tinctures, Essences, and the most delicate Perfumes, being perfectly free from smell and Füsil Oil. Can be obtained through Druggists with E. B. and Sons' name and label on bottles, &c.

Packages to be paid for and allowed upon return.

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SUN STREET, LONDON.

Also at DUNNING'S ALLEY and 1, LAMB ALLEY.

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ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 47 out of 51 Pupils passed the last Examinations.

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Free from "Common Salt," which is found in most of the articles now sold.

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W. B.'s Purest Treble Sublimed Carbonate of Ammonia (Lump and Ground).

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TRINITY SQUARE, BOROUGH, LONDON, S.E.

The next Course of Lectures will commence on Monday, October 27th.

Students can enter at any time, but are advised to enter at the commencement of a Course.

Any diligent Student with ordinary ability, who is punctual in his attendance at the Lectures and Classes, may rely upon passing his Examination at the FIRST ATTEMPT.

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To the December Examination	...	£5 5s.
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The First Course of Lectures and Classes of this Session has now commenced, and is attended by a full class of Students. A Short Course, especially adapted for Students who have already acquired a knowledge of the subjects, will commence on Monday, October 27th. Should any candidates join then who are commencing their studies they will complete the full Course by February next. Fees to December, 6 guineas; to February Examinations, 9 guineas.

For Prospectus apply to

Messrs. LUFF & WOODLAND

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PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(*From the Royal School of Mines*),

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Notwithstanding the great mortality at the June and July Minors, over seventy-five per cent. of my students were successful at the two combined. Individual personal instruction, as usual. No demonstrators. All students work *separately*, therefore entry may be made at and for any length of time. Postal teaching for Preliminary and Minor a speciality; books unnecessary, notes sufficient. Send stamp for terms, &c.

LABORATORY CLOSE TO GOWER STREET STATION.

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PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, Gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium, 100 Plants, 5s.

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Established in 1878. **MARSHALL STREET, NICOLSON SQUARE.** *Established in* 1878.

The SESSIONS of this School commence on 1st of October; 5th of January, and 4th of May, 1885.

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BOTANY .. .. J. A. THOMSON, M.A. | MATERIA MEDICA and PHARMACY .. .. R. URQUHART.

Particulars from R. URQUHART, Secretary.

From Oct. 1st, 1884, till May, 1885.

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Special Lectures and Demonstrations on Wednesday evenings (expressly arranged for assistants occupied during the day).

Materia Medica, 7 p.m.
Principles of Pharmacy, 8 p.m.

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Late Scholar and Exhibitioner of King's College, London; for three years Chemical Demonstrator, Royal School of Mines; Silver Medallist in Therapeutics, Royal College of Surgeons, Edinburgh; Quadruple Medallist, School of Pharmacy, London (1878); Lecturer in Botany, Chemistry and Physics at various Institutions.

30 lessons in each course. Fees, £1 per subject.

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Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

SEVENTEENTH SESSION, 1884-5.

A few vacancies still remaining.
The next term will commence 7th January, 1885.
For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

ENGAGEMENTS WANTED.

AS out-door ASSISTANT or MANAGER of Branch. Accustomed to a general country business. Qualified. Single. Please state salary and full particulars, to ASSOCIATE, 115, Norfolk St., King's Lynn.

SURGEON'S ASSISTANT.—Good Bookkeeper and Dispenser. Accustomed to Chemist's Retail. Over 11 years with present employer. 19 years' experience. Good references. C. C., Mr. Griffiths, Chemist, Bridgend, Glamorgan.

TEMPORARY, as DISPENSER. South of England preferred. 6 years' town and country experience. X., Bidgood's, Kingsaympton, Chulmleigh, N. Devon.

AS ASSISTANT. Age 22. Height 5ft. 10½in. 5 years' experience. Highest references. Permanency preferred. CHEMICUS, Messrs. Hughes, Chemists, Holyhead.

A GERMAN ASSISTANT, who knows English, wishes a position in England or any English Colony where German is wanted. Age 23. RADETZKY, Frankfort-on-Maine, Flora Apotheke.

AS ASSISTANT, for 3 or 4 months. Out-door. Qualified. Age 25. London, W. or Coast. Disengaged November 1st. CHEMICUS, 14, Raul Rd., Peckham, S.E.

TO APPRENTICE (in-door), a well educated youth to a Chemist and Druggist. Age 16. Passed Preliminary. JOHN CHAMBERS, Blankney Fen, Lincoln.

AS JUNIOR. Age 22. Height 5ft. 8in. Abstainer. 6 years' experience. London preferred. Moderate salary. Excellent references. C. HARRIS, 9, St. James Rd., Stratford, E.

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ENGAGEMENTS WANTED.

AS JUNIOR. Age 23. 7 years' good experience. Able to Prescribe and Extract Teeth. Good references. J. P. KING, 173, Ashton Rd., Openshaw, Manchester.

PARTIAL employment as DISPENSER or ASSISTANT. 5 years' experience and reference. Disengaged daily, 2.30. E. W. P., 27, Ryland Rd., Prince of Wales' Rd., Kentish Town.

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AS JUNIOR or IMPROVER. Age 21. Now disengaged. CHEMICUS, Mr. Moore, 48, Queen's Row, Walworth, S.E.

AS ASSISTANT or MANAGER, in good permanency. West-end experience. Age 34. PHARM. CHEMIST, 14, Regent's Sq., W.C.

BY a competent qualified ASSISTANT. Age 24. In a good provincial house. Disengaged shortly. T. W., 413, Oxford St., W.

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SENIOR, with view to succession or Locum Tenens. London or Watering place on South or West Coast preferred. At liberty in November. GULIELMUS, 30, Western Rd., Hove, Brighton.

LOCUM TENENS. Day, week or month. Town and country experience. Minor qualification. Good references and moderate terms. A. P. S., 34, Bridge St., Cambridge.

AS ASSISTANT. Age 23. 8 years' experience. Minor qualification. Highest references. J. G. DUNN, Fore St., Chard.

AS JUNIOR. Aged 25. Height 5ft. 9¼in. In or out-door. Satisfactory references. 7 years' good experience. Disengaged. W. REAM, The Elms, Long Sutton, Lincolnshire.

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LOCUM Tenens. Qualified. By the day, week or month. Town or country. Chemicus, 51, Judd St., St. Pancras, W.C.

IMMEDIATELY.—As Assistant to Surgeon or Chemist. Good Prescriber, Dispenser, and Tooth Extractor, or would act as Traveller. Good references and security if required. Out-door. Medicus, Gloucester St., Malmesbury, Wilts.

AS Assistant, in London. Out-doors. Nearly 4 years' experience. Age 22. Height 5ft. 8in. Statim, 49, High St., Hampstead, N.W.

AS Manager or to hold a leading position in a high-class business. Age 32. E. V. T., Mr. Mark Smith, Chemist, Louth.

AS Temporary Manager or Locum Tenens. Great experience, town and country. Highest references. W., 10, Loughborough Rd., S.W.

LOCUM Tenens or Manager, by a Pharmaceutical Chemist with first class experience and highest references. Beta, 67, Paescod St., Windsor.

AS General permanent Assistant, Mixed country trade, Manager of Branch, Locum Tenens. Total abstainer. Good references. Moderate salary. Carryophylum, 171, Commercial St., Newport, Monmouthshire.

AS Assistant or Manager. Major qualification. Disengaged. Age 24. C. G. C., 24, Holland St., Kensington, W.

AS Assistant, in good class Dispensing and Retail. Age 26. Minor. W., 17, Broad Gate, Coventry.

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A JUNIOR Assistant, in-doors. One accustomed to a good class of trade. Apply to G. F. Huntley, The Square, Wimborne, Dorset.

A TRUSTWORTHY, energetic Junior Assistant, for a good Mixed Retail, Drug and Agricultural business in Cambridgeshire. Hours light. Comfortable home and time for study. Good reference indispensable. For further particulars, apply, personally or by letter, to Calverwell, care of Dr. Drake, The Surgery, Broadway, Stratford, E.

ASSISTANT, of good experience and address, with first-class references, for good business, where 4 are employed. Age about 23. Apply to W. Malden & Co., 195, Brompton Rd., near South Kensington Museum, London, S.W.

STEELE & MARSH, Bath, will require early in November a gentlemanly Assistant (in-doors). Must have been accustomed to good class Dispensing. Applicants will please state age, height, salary required, and references, with carte (to be returned).

AN Assistant, accustomed to the routine of a first-class Retail and Dispensing business. He must possess the Minor qualification. Apply, stating usual particulars, and enclosing carte if convenient, to J. Burton, Chemist, Llandudno.

A THOROUGHLY trustworthy, competent and gentlemanly Assistant. Age about 22. Must be steady and possess good references. To manage a Branch business. Apply, enclosing testimonials and photograph (to be returned), to Edmund Jones, Chemist, Hanley, Staffs.

OUT-DOOR.—Immediately. An active and obliging Assistant, of good appearance and address. For a brisk ready money business, where 3 are kept. Apply, with carte de visite, stating age, height, salary and experience, to E. J. Kitson, The City Drug Stores, Worcester.

ASSISTANTS WANTED.

ST. Mary's Hospital, W.—Laboratory Man. Must be accustomed to Hospital Work. Wages 25s. per week. By order,
4th October, 1884. Pietro Michelli, Secretary.

REPRESENTATIVE.—Druggists' Sundries. S. Maw, Son & Thompson, 7 to 12, Aldersgate St., London, are in want of a gentleman as representative to travel abroad. None but experienced men who understand the business, with first-class references need apply.

IMMEDIATELY.—A Junior Assistant. Apply to B. Banks, Chemist, Folkestone. State salary required. References and carte.

IMPROVER or Junior, who has just completed his apprenticeship, for light Retail and Dispensing business. State age, height and particulars, to T. M. Davies, Chemist, Rhyl, N. Wales.

IMMEDIATELY.—An Assistant, for light Retail and Dispensing. A comfortable home. Apply, stating age, salary required, and references, to C. F. Bevan, Pharmaceutical Chemist, Harwich, Essex.

AN Assistant, not under 23 years of age. Must have been accustomed to a good class Retail and Dispensing business. State particulars and salary required. C. D., Hancock's Library, Bishops Rd., Paddington.

A STEADY, trustworthy Assistant, by a Medical man, to Manage a small Chemist's shop, near Regent St. He could reside on the premises. This offers to a studious man an eligible position. Mutual arrangements might ultimately be made. Address, Medicus, care of Eade & Caulfield, 7, Princes St., Cavendish Sq.

IMMEDIATELY.—A trustworthy, energetic Junior Assistant, for a Mixed Retail, Drug, and Agricultural business. Able to take sole charge if necessary. Good references indispensable. State age, height, salary, and all particulars, enclosing carte de visite (to be returned), Maitland & Son, 94, Treville St., Plymouth, and 31, Chapel St., Stonehouse.

AT once.—A Junior, age about 20, in a good Retail and Prescribing. One seeking a permanency and improvement would find this an excellent opportunity. Must have passed Preliminary. Comfortable home. Little Sunday duty. First-class references required. Apply, personally, if by letter, state salary and all particulars, to W. M. Covell, 302, Mare St., Hackney.

ASSISTANT, to attend to a small Branch business. Ample time given for study in lieu of part salary, and progressive salary as business is increased. Personal application if possible, or full particulars to W. Dee, 77, King St. East, Hammersmith, W.

JUNIOR, of good character, in-doors, where another is kept. Apply, personally preferred, to H. Austin & Co., 126, Bermondsey St., London, S.E.

DISPENSER.—Mr. Stamp, Hampstead, N.W., will have a vacancy about the 20th inst. Must be accurate, quick and neat in his work, and have had experience as Dispenser in first-class Pharmacies. Apply, personally or by letter (enclosing photo), at the above address.

IMMEDIATELY.—An Improver, about 19. Also for the 27th inst., a Junior, for a light Retail branch. Both must be steady, willing and obliging. Address, with full particulars, salary, &c., to J. Holloway, Chemist, Wood Green, N.

A COMPETENT Assistant, for November 1st, about 23. Must be well up in Dispensing and write a neat hand. State age, height, references and salary, enclosing carte (to be returned). H. Dixon, 1, Russell Gardens, Kensington, W.

AN Assistant, of good address, for a first-class Dispensing and Retail business. Apply, with refereuces and full particulars, to E. Dunkley, Pharm. Chemist, Tunbridge Wells.

ASSISTANTS WANTED.

APPRENTICE.—C. PICNOT, Pharmaceutical Chemist, Strood, Rochester, has a vacancy for a well educated youth as an APPRENTICE. One who has passed the Preliminary preferred. Comfortable home insured and every facility given for thoroughly learning the business.

APPRENTICE.—A Pharmaceutical Chemist requires a gentlemanly and well educated youth as APPRENTICE, now or in a month hence. Comfortable home and every facility offered. Moderate premium. Apply, by letter, to A. B., Messrs. Thos. Hodgkinson, Prestons & King, 81, Bishopsgate St. Without.

APPRENTICE.—J. HARTLEY, Chemist, Lytham, requires a well educated youth as an APPRENTICE.

AN APPRENTICE.—A well educated youth, in an old established good class Family and Dispensing business, affording every facility for gaining a thorough knowledge of the business. Premium moderate. A Porter kept for warehouse and rough work. Apply to Mr. S. Goss, Pharmaceutical Chemist, Opposite the Hotel, Barnstaple.

ASSISTANT. Out-door. About 24 years of age. Must be well accustomed to Dispensing. Apply, with full particulars, to R. C. L., 93, Finsbury Pavement, City.

JUNIOR or IMPROVER, in a high class Dispensing business, about November 4. Abstainer preferred. State age, height, experience, and references, to J. V. TOONE, formerly Steele & Smith, 14, New Bond St., Bath.

IN 3 weeks.—A Junior ASSISTANT, accustomed to an Agricultural trade. If able to Extract Teeth preferred. Apply, stating age, height, experience, and salary required, to H. C. WEBB, Pharmaceutical Chemist, Buckingham. Carte de visite if convenient; to be returned.

BY end of October.—Good Dispensing ASSISTANT, accustomed to first-class business. One kept. State age, height, salary, and last situation, carte, if possible, to W. RANSFORD, Chemist, Clevedon.

IMMEDIATELY.—An ASSISTANT, in or out-door, for Mixed business. Apply, JOHN R. THOMPSON, Chemist, Bakewell.

IMMEDIATELY.—A Junior ASSISTANT (in-door), for a Dispensing and Retail business. W. SADLER, 115, Stoke Newington Rd., N.

IMMEDIATELY.—An ASSISTANT, as Junior, not under 22, accustomed to first-class Dispensing business. 3 kept. Apply, stating age, height, salary, and references, with carte, if convenient, to W. H. PULLIN, Leamington.

JUNIOR or IMPROVER, out-door, in a light Mixed country Retail, Herts. Pleasant neighbourhood. Short hours. No Sunday duty. Apply, enclosing carte, to C. B., care of Newbery & Sons, 1, King Edward St., Newgate St., London, E.C.

MESSRS. BRADLEY & BOURDAS require a competent registered ASSISTANT, accustomed to Dispensing. Apply, personally or by letter, at 48, Belgrave Rd., S.W.

DR. SARGENT, Dorrell Pl., Brixton Railway Station, London, requires an ASSISTANT able to Dispense and attend a Chemist's Retail. Suit a gentleman of sober and steady habits, with good reference, fond of reading. Apply, stating salary required and when disengaged.

A JUNIOR, immediately, to act as Clerk and assist in Dispensing, &c. In-doors. Apply, first by letter, stating age and experience, to W. MARTINDALE, 10, New Cavendish St., W.

A JUNIOR ASSISTANT, accustomed to a good class Retail and Dispensing business. Please state age, height, and salary required. BERRY & SON, Chemists, Gloucester.

ASSISTANTS WANTED.

MALTA. — ASSISTANT, with Minor qualification. Must be well up in the business and of sober and gentlemanly habits. Apply to HODGKINSONS, STEAD & TREACHER, 198, Upper Whitecross St., E.C.

BRADY & MARTIN, Newcastle-upon-Tyne, require a competent ASSISTANT for the Retail and Dispensing counter.

BUSINESSES FOR DISPOSAL.

GLOUCESTERSHIRE.—A high class Dispensing and Prescribing BUSINESS, with a great many valuable Proprietary Articles. A profitable Aërated Water business combined. All with large profits. Corner shop, with very large house. Best position in the town, and most elaborately fitted up. Rent £160 per year; £30 per year let off to a Dentist for one day in the week, and most of the rent could be realised by sub-letting. Returns £798. No goodwill, and at valuation. Failing health the only reason for selling. Apply to W., care of Messrs. Southall Bros. & Barclay, Birmingham.

LEICESTERSHIRE.—Pretty country RETAIL, with nice house. Large garden. In good class and pleasantly situated village. Population 2500. No Chemist for miles. Returns are £400 in light Retail, Dispensing and Prescribing. With Agricultural trade added a large return might be made. Vendor having accepted an engagement will take £275, part of which might remain. Rent £20. Taxes almost nil. F. J. BRETT, Licensed Valuer, Leicester.

PHARMACY, with good residence, arranged specially for best class business. Occupying commanding position in Broad St., close to Edgbaston, the wealthy suburb of Birmingham. This is an excellent opportunity for an accomplished Chemist to carry on a superior and lucrative business, which has been successful for 30 years. Good class Dentistry could be added with advantage. No fixtures and no goodwill to be paid for. Apply, Mr. EDWARDS, 16, Bennett's Hill, Birmingham.

LEICESTER (suburb).—A genuine Dispensing and Prescribing BUSINESS, with Aërated Water Machinery and Syphons attached, for £600 (without Machinery, &c., £500). Aërated Waters nearly pay rent. Splendid opening for Dentistry. Good house and storeroom. Rent £55, on lease. Satisfactory reasons for disposal. Address, W. ROWE, Chemist, Leicester.

EAST Coast.—A good class Retail and Dispensing BUSINESS. Returns about £600. Capable of great increase. Satisfactory reasons for disposal. In best position of rapidly increasing town. Apply, by letter, to P. P., care of Messrs. Hodgkinson, 198, Upper Whitecross St., London.

£120 cash.—Bargain. A Retail and Prescribing BUSINESS, doing about £4 10s. weekly, but easily increased by attention and good Prescriber. Convenient house; part can be easily let. Owner retiring. Address, MEDICUS, 94, Canterbury Rd., Kilburn, N.W.

MESSRS. HINE GILBERT have for transfer:—Bonâ fide BUSINESS of £1000 yearly. Possession arranged with £100 cash. Grand opportunity for gentleman commencing. Another. Good suburb. Returning £600; increasing. Handsomely fitted, and good house. First reasonable offer. For full particulars of these and others, apply at 17, Hart St., Bloomsbury Sq.

IN a provincial town.—An old established high class Pharmaceutical BUSINESS, with a select and increasing Aërated Waters Manufacturing business combined. This is a genuine concern, admitting of the fullest investigation, and is an exceptional opportunity for two young men with capital. Apply, G. A., care of Messrs. Orridge & Co., 32, Ludgate Hill, London, E.C.

BUSINESSES FOR DISPOSAL.

IN a populous village (Notts), a genuine Retail and Family Druggist's BUSINESS. Returns nearly £700. Satisfactory reasons for leaving. Price about £450. Every facility will be given to a bonâ fide customer to investigate the business, which can be entered upon immediately. Apply, first by letter, to HENRY GEORGE, Newark-on-Trent.

TO Medical Men or Chemists.—On easy terms, an open SHOP in a busy street in the City. Would suit a young beginner willing to work; or as nucleus to Branch practice. Low rental (£45), with lease, if desired. Apply by letter to A. B., 144, Hampstead Rd., N.W.

FIRST-CLASS Retail, Dispensing and Prescribing BUSINESS. Well stocked. Handsomely fitted. Returns £340. Large profits. Price £330, part of which can remain. Satisfactory reason for disposal. Apply, J. R., 32, Irvine Pl., Aberdeen.

EXCEPTIONAL opportunity.—Chemist's Retail and Mineral Water Factory, in large good class Midland town. Returns £2400, and capable, with personal attention, of considerable increase. The whole will be sold at valuation of stock and fixtures, about £1400, as vendor's time is taken up entirely in other matters. A respectable, trustworthy man can leave half purchase-money on, to be paid in convenient instalments. F. J. BRETT, Valuer, Leicester.

HAMPSHIRE. — Exceptional opportunity for any gentleman commencing. An established light Retail, Dispensing and Prescribing BUSINESS. Rapidly increasing and well stocked. Returns £400. Modern mahogany fittings. Good house. Rent low. Corner position in main street. Incoming, value of goodwill, stock and fixtures. Good reasons for disposal. Address, A. R., care of Messrs. Hodgkinson & Co., 198, Upper Whitecross St., London.

NEAR London.—New BUSINESS. Now taking at the rate of £600 a year. Rapidly increasing. Working class, Prescribing and Penny trade. Very profitable. Thoroughly satisfactory reasons for selling. A good Dentist much wanted. Apply to RHEI, care of Newbery's, Newgate St., E.C. N.B.—Letters without bankers' or other reference not answered. About £500 required. Parties without that need not apply.

IMMEDIATELY.—Well situated. An excellent Dispensing, Prescribing and general Retail BUSINESS. Established. Of a very profitable character. Shop (double-front) well fitted and stocked. Convenient house; private entrance. Garden. To effect an early sale the first reasonable offer will be accepted. ALPHA, Messrs. Southall Bros. & Barclay, Manufacturing Chemists, Birmingham.

AN excellent opportunity for a good Chemist with small capital offers itself to continue a BUSINESS in a thickly populated part of S.E. district. Shop has been conducted as a Chemist's and Druggist's for over 30 years by one proprietor. There is little opposition, and is a good corner house. Address, with full enquiries, M. O., care of Davy, Yates & Routledge, Druggists, Park St., Southwark.

TO Chemists and Dentists.—A small, but genuine, BUSINESS, in a N.W. suburb. Established over 25 years. Long lease, at a low rental, which is nearly covered by sub-letting. Satisfactory reasons for disposal. Average returns £400. Price for prompt cash payment £300. Address, C. S. W., 6, Manchester St., King's Cross. W.C.

£400 will buy a genuine ready money BUSINESS, returning £650 per annum, and rapidly increasing, in a busy S.W. suburb. Good house and shop. Very handsomely fitted. This is a bargain to a steady man. Splendid opening for Dentistry. No agents need apply. Address, KUDOS, 438, Fulham Rd., Fulham, S.W.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for transfer:—KENT (Coast). Rare opportunity for Chemist and Dentist. Old-established Retail and Prescribing trade. Returning £6 weekly now, by female management; formerly £700. Through death. Excellent house, close to the sea. £250, or offer. Also, death vacancy, in large village. Same hands 15 years. Returns £400. Rent £14. £130. SOMERSET (Coast). Retail and Dispensing trade. Returns £1000. Rent £30. For £900. SOUTH COAST. Retail and Prescribing trade. Main thoroughfare. Returns £450. Good profits. £400, or offer. HANTS (close to sea). Retail, Prescribing and Dentistry. Returns £800. Owner retiring. For £700. SUSSEX. Genuine Retail, Prescribing and Dispensing trade. Returns £700. For £675. LONDON, N.W. Main road. Retail and Prescribing. Same hands 24 years. Returns £550. Well fitted and stocked. For £500. S.W. Rare bargain. Owner taken larger trade. Elegantly fitted corner. Returns £650. To sell, £400. S.E. Old established Retail and Prescribing. Returns £1400. Net profit £450. For £800. E. Same hands 5 years. Returns £6 weekly, guaranteed. Genuine living. Taken larger trade. Only £130. Apply, 30, Jewry St., Aldgate, City. Sales by auction conducted. Valuations for sale or probate.

WANTED TO PURCHASE.

A CHEMIST'S BUSINESS, in good going order, at present returning not less than £1000 a year, and capable of increase. Address, stating full particulars, A. B., care of Messrs. Clarke, Bleasdale & Co., York.

A GOOD class light Retail and Dispensing BUSINESS. Returning about £500 to £600, and capable of increase. Situated on Great Western line or in Midland Counties. A. P. S., 55, Avenue Rd., Leamington.

BY a Chemist desirous of resuming business, a good class Retail, Dispensing and Prescribing TRADE. South or South-east preferred, but not essential if a good business offers elsewhere. Cash ready from £1000 up to £2000. Particulars received in confidence. W. LEECH, Chemist, 34, Quested Bldgs., Hackney.

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TO Chemists and others.—Noble corner SHOP. Commanding position for above. Respectable neighbourhood. Apply on the premises, The Pavement, Elthorne Rd., Hornsey Rise.

ISLE of Wight.—Rare opportunity offers for establishing a good class Dispensing BUSINESS. Situated in one of the best positions in the Island, facing the sea. Been a Chemist's for many years. Now vacant. Splendid premises. Only wants fitting. Lease granted. No premium, and rent free till Christmas. Excellent opportunity to a Chemist or Dentist. Full particulars, Messrs. BERDOE, 30, Jewry St., Aldgate, City.

FOR SALE.

A LARGE outside Lamp and Bracket, price 15/-; a 4ft. mahogany upright Case, as A 54, £3; Writing Desk and Case, as A 32, £3; circular fronted Tooth Brush Case, £1 10s.; 5ft. Wall Fitting, as A 85; mahogany plate-glass Counter Case, 6ft. long, as A 18, £6; 1 7ft. long, £7; a Cigar Case, 4ft. long, A 35, 20/-. BYGRAVE, 12, Curzon Street, Wenlock Street, Hoxton, London, N.

TO CHEMISTS ISSUING ALMANACKS.

THE proprietor of Feltwell's Balsam of Aniseed, Licorice, and Linseed will be glad to include an advertisement in almanacks. State price, quantity issued. To chemists accepting agency for this remedy will find terms very favourable. J. W. FELTWELL, Chemist, 91, Hammersmith Road, London, W.

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VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

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MIDLANDS.—Good class Retail, Dispensing and PRESCRIBING, returning £800 (over), ill-health sole cause of sale, price £500.

WESTERN TOWN (fashionable).—First-class Retail and DISPENSING, returns £800, price £700, Major man would double returns in 2 years.

GLOUCESTERSHIRE. — Death vacancy, noble plate-glass fronted shop, house large and convenient, returns £750, capable of considerable increase, price £650, or as arranged.

NORTHERN SEAPORT.—Medicine Chest Trade, with RETAIL, all cash, returns £1100, net profit £300 to £400, large shop, at low rent, price £650.

SOUTH COAST.—Light RETAIL, good corner position, returns over £400, splendid opening for Dentistry, price £300, part payment could be deferred on mutually advantageous terms.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

VIZER'S

CHEMISTS' TRANSFER and ASSISTANTS' REGISTRATION AGENCY,

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MR. EDWIN B. VIZER, Pharmaceutical Chemist, having been engaged in the business for the last 36 years, is prepared to offer special advantages to his clients.

Gentlemen desiring to dispose of their businesses without undue publicity may depend on special precautions to that end, by request.

Purchasers applying for businesses should specify locality preferred and capital to be invested.

No charge to purchasers.

No charge to vendors unless a sale is effected.

ASSISTANTS' REGISTRATION DEPARTMENT.

Employers and Assistants should send full particulars of requirements, with Registration Fee, 2/6, *Postal Order.*

FOR DISPOSAL.

THE Numbers of the PHARMACEUTICAL JOURNAL, unbound, from June, 1872, to June, 1884. A liberal offer will not be refused. THEOPHILUS ACKERMAN, Wholesale Druggist, Dyssalter and Oil Merchant, Redcliff Hill, Bristol.

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MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

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3. £800.—LONDON, N. Handsome PHARMACY, quite new. For disposal on account of private affairs; the particulars will be given in confidence. The investment of about £800 is required.
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5. £1200.—YORKSHIRE. Large town. Returns about £1200. Small premium and valuation.
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Full particulars furnished on application.

Other businesses, town and country. Particulars free on application.

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Terms for valuation on application.

Appointments for October should be made early.

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Important to Chemists Fitting or Re-fitting.

FOR Sale.—Range of 64 large second-hand Drawers, with glass knobs and new gold labels, 96s.; 72 1 pint Rounds, labelled, 45s.; 48 8 ounce ditto, 24s.; 12ft. mahogany Drawers, new, with glass knobs and gold labels, 66, £8 5s.; 36 1 gallon black Bottles, capped and newly labelled, 1s. 8d. each; 1 nearly new 22-inch Globe Lamp and handsome Bracket, £5; 1 ½ gallon Tincture Press, 15s. 6d.; the complete Fittings of a chemist's shop for £37 10s. Estimates and illustrated lists free on application to R. TOMLINSON, Midland Medical Fitting Establishment, 15, St. Paul's Sq., Birmingham.

1884. EIGHTEENTH SEASON.

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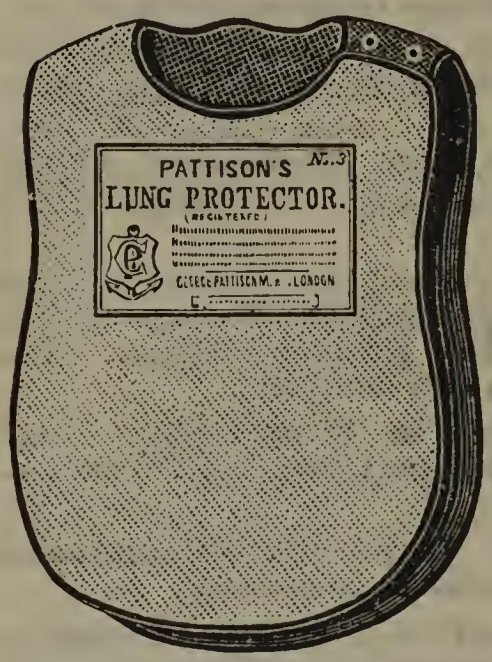

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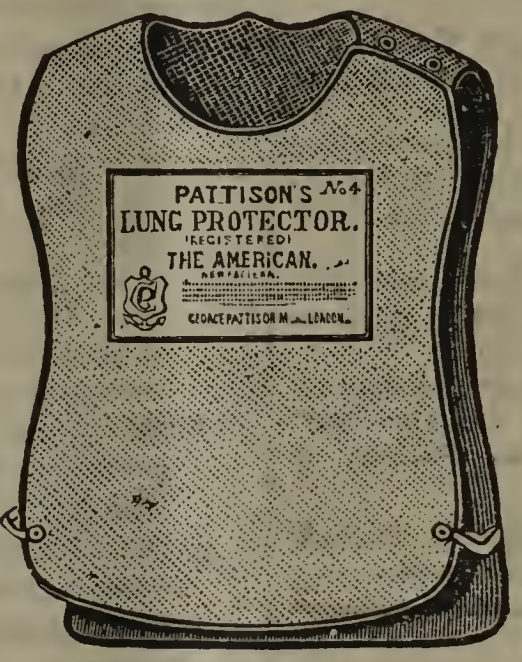

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Lung Protector.
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FELT CHEST PROTECTORS.

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Prices ... ...,	4/-	6/-	8/-	10/-	12/-	16/-	20/-	24/-	per doz.

All in Scarlet and White, and made in same Wool as the "Lung Protector."

Terms: All Wholesale Houses either allow a large Discount for Cash, or quote the goods at Reduced Net Cash prices.

FELT CHEST PROTECTORS, C QUALITY, single and double, each in five sizes.
At lower prices than above, and equal to BEST of other makers, but are NOT recommended.

GEORGE PATTISON,

Inventor and Manufacturer,

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 747.] SATURDAY, OCTOBER 18, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

Page
The Collection of Gum Labdanum in Crete. By W. T. Thiselton Dyer, F.R.S, etc. 301
Notes on Recent Donations to the Museum of the Pharmaceutical Society. By E. M. Holmes.—IV. Medicinal Plants used by the Cree Indians 302
Aloes. By Dr. Squibb 304
Behaviour of some Fats and Lubricating Oils with Acetic Acid. By E. Valenta 306
The Deposition of Silver on Glass, etc. By F. L. James 306
The Detection of Adulterated Essential Oils. By H. W. Langbeck 309

EDITORIAL ARTICLES AND NOTES:—
The Repetition of Prescriptions 311

Page
Notes:—Meeting of the Medical Council—Report of the Pharmacopœia Committee—Sir William Harcourt on the Cultivation of Science—Yorkshire College of Science—The Colour of Extract of Cannabis Indica—Deaths from Snake Bites in India—Medical and Pharmaceutical Exhibition 312

PHARMACEUTICAL SOCIETY OF IRELAND:—
Annual Meeting 313

PROVINCIAL TRANSACTIONS:—
Hawick Pharmaceutical and Chemical Association 314
Oldham Chemists' Assistants and Apprentices' Association 315

Page
Edinburgh Chemists' Assistants and Apprentices' Association 315

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE:—
Steps towards a Kinetic Theory of Matter. By Professor Sir William Thomson 315

PROCEEDINGS OF SCIENTIFIC SOCIETIES:—
Chemists' Assistants' Association .. 320
International Health Exhibition:—Vegetarianism 320

CORRESPONDENCE:—
The Solubility of Pills in the Stomach 320
Answers to Correspondents 320

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 5th, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at half-past 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 29th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held.

NORTH BRITISH BRANCH.

36, YORK PLACE, EDINBURGH.

The Society's Rooms at 119A, George Street, Edinburgh, are closed. All communications should be sent to the new premises, 36, York Place, Edinburgh, which are now open.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 5th day of December next, at 12 o'clock precisely.

By order of the Council,

RICHARD BREMRIDGE,

Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 1st, 1884.

For list of approved Candidates see next page.

There are at present *thirty-nine* annuitants, receiving £1320 per annum, and casual relief is also granted, amounting to nearly £700 per annum, involving a total annual expenditure of upwards of £2000.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and

£35 per annum to pensioners 65 years of age and upwards.

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1.—Braithwaite, Annie Elizabeth. Age 51. Twickenham. Widow of an Annuitant, who was formerly an Associate of the Society, and for thirteen years an Assistant in the Society's Laboratory, and subsequently for sixteen years a teacher of chemistry. Applicant is endeavouring to make a living by letting apartments.

2.—Cooke, John. Age 64. London. A Member of the Society from 1853 to 1877, and subscriber to the Benevolent Fund from 1865 to 1878. Applicant carried on business in London for thirty-six years, but failed through ill-health. He is, from the same cause, quite incapacitated from earning anything. *Second application.*

3.—Davies, Caroline C. Age 56. London. Widow of an Annuitant, who was a Member of the Society from 1842 to 1870, and a subscriber to the Benevolent Fund for twenty-six years. Applicant is in delicate health, suffering from internal disease, and dependent upon her children, who are barely able to maintain themselves.

4.—Davis, Francis. Age 77. Hereford. A Member of the Society and Local Secretary for Leominster from 1841 to 1858. Applicant was in business on his own account at Leominster for twenty-seven years, and retired about twenty-five years ago, but was unfortunate in his investments and lost all his money. His wife, age 60, has about £40 per annum. Applicant's age precludes his obtaining employment.

5.—Fowler, Sarah Anne. Age 64. London. Widow of a registered Chemist and Druggist before August 1st, 1868, who carried on business in London for several years. In 1872 he met with a railway accident (from which he suffered for a period of nine years before his death in a lunatic asylum) but failed to get compensation from the Company. Applicant has partially lost the use of her right hand by accidental poisoning, necessitating the amputation of her fore-finger. She is in very delicate health and is dependent for support upon the charity of friends. *Second application.*

6.—Glynn, Elizabeth Pearse. Age 63. Torquay. Widow of a Member of the Society from 1846 to 1878, when, after an illness of ten years, he died, leaving no provision for his family. He was in business on his own account at Torquay for thirty-three years. Applicant, whose sight is very imperfect, has two daughters, who assist her in letting apartments. Her only son is incapable of work owing to mental weakness, and is dependent upon her for support.

7.—Goadsby, Elizabeth. Age 65. Salford. Widow of a registered Chemist and Druggist before August 1st, 1868, who died in April, 1882. Applicant is quite unable from excessive weakness to do anything to earn her own living. A lady allows her £12 a year, but she has no other means of subsistence.

8.—Johnson, George Thomas Fortin. Age 74. St. Leonard's. A registered Chemist and Druggist before August 1st, 1868. He was in business on his own account for eight years at Norwich, and at St. Leonard's for thirty-seven years, where he failed in 1868. Applicant is dependent upon the charity of friends, and is incapacitated by age from earning anything towards his maintenance.

9.—Read, Robert Elimelech. Age 66. London. An Associate from 1842 to 1845, and a Member from 1875 to 1881. Applicant was in business at Hadleigh, Suffolk, where he failed in 1878. Since then he has been trying to get a living by driving a cab, but his failing eyesight render it difficult for him to continue to support himself in this way.

10.—Sanders, George Lee. Age 73. Tiverton. A Member of the Society from 1841 to 1851, and for some years a subscriber to the Benevolent Fund. Applicant was in business on his own account at Tiverton for forty years, where, in consequence of his age and inability to attend to it, the business gradually fell off and was eventually sold to pay creditors. Applicant has an income of £12 a year.

11.—Stephenson, Thomas. Age 72. Rothwell. A registered Chemist and Druggist before August 1st, 1868. Applicant was in business on his own account at Rothwell for forty-five years, and in 1881 he became paralysed, and can now only get about with difficulty. He is unable to earn anything and is dependent upon his children, who are married and cannot render him much assistance.

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And it was further ordered that the Defendant do pay the costs of the said action.

Dated this 12th day of August, 1884.

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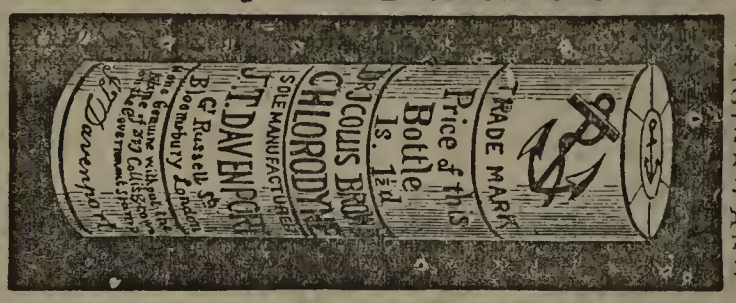

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DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

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IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

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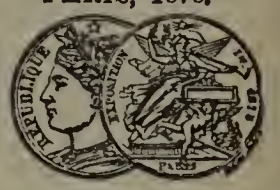

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"New York Medical Journal," *August* 1880,
Dr. F. Weir,
in Lecture delivered to the College of Physicians and Surgeons, New York.

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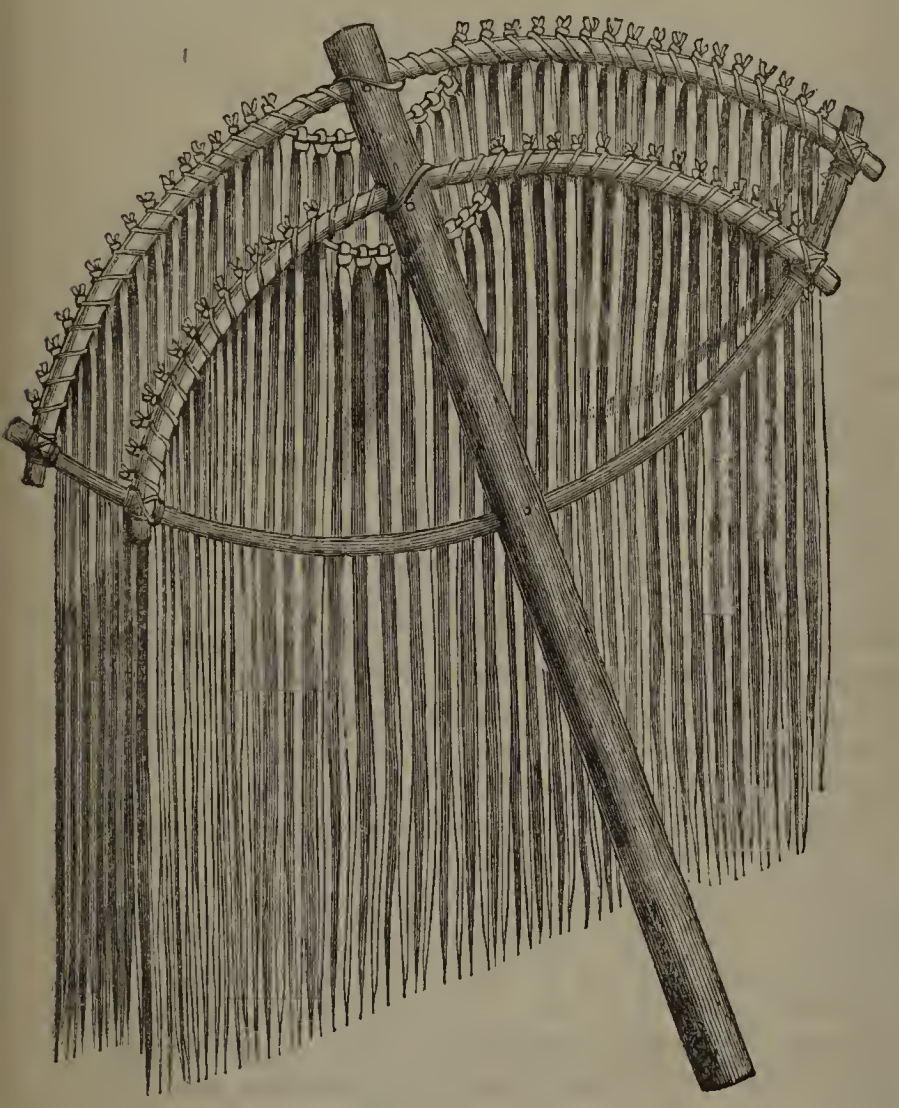
THE COLLECTION OF GUM LABDANUM IN CRETE.

BY W. T. THISELTON DYER, M.A., C.M.G., F.R.S.,
Assistant Director, Royal Gardens, Kew.

Gum labdanum is a drug which has long dropped out of modern pharmacy. According to Bentley and Trimen ('Medicinal Plants,' vol. i., tab. 24) it is at the present time chiefly used by the Turks for fumigation and to some extent as a perfume; about 6000 lbs. are annually exported from Crete, and from 2500 to 2800 lbs. from Cyprus. The gum is an excretion from short glandular hairs with which the exceedingly viscid leaves are covered. The collection of such an epidermal secretion from living plants is probably unique amongst the economic products of the vegetable kingdom. "In Cyprus, labdanum is collected by the shepherds by combing the resin from the fleeces of the sheep, which become loaded with it while they are pastureing." In Crete, however, a special instrument called a *Ladanisterion* is used, a kind of double rake with leathern thongs instead of teeth.

Very many of the smaller industries connected with plant products are dying out as commerce more widely diffuses the use of other products which are either better, cheaper or more easily procured than local ones. It seemed worth while to try to secure for the Kew Museum one of these singular instruments before, like many other such things, they have passed out of use. This with the aid of the Foreign Office we succeeded in doing, and with little difficulty. Mr. Sandwith, H.M. Consul in Crete, very kindly procured us an excellent example of a ladanisterion, which is now in the Kew Museum. The accompanying illustration represents its appearance, of course on a much reduced scale.



The account which is usually given of the mode of collection of the drug is apparently derived from that given by Tournefort ('Voyage into the Levant,' vol. i., pp. 56–60; London 1718). The whole narrative of his personal observations and the extreme jealousy with which they were regarded is so curious and in such singular contrast to the prompt and business-like rapidity with which the instrument was procured by Mr. Sandwith, that it seems to me to deserve being quoted *in extenso*.

"At our return to *Retimo*, we were told, that then was the Harvest-time for Ladanum; and if we had a mind to see it, we might go to *Melidoni*, a pretty village lying to the Sea, 22 miles from *Retimo*: we lay there the 22nd of *July* at a Papas, to whom we were recommended by Dr. *Patelaro*. This Papas promis'd to shew us all the Curiosities of the Country. . . . The next day we were mortify'd at the Proceeding of a *Turk*, who was gathering the Tythe in those parts, and whom we were afraid to invite to Supper, because we had nothing to eat but a Pig. This *Turk* understanding our design, came to the Papas, ... saying we were Spies, and that we made remarks on everything; that he had been inform'd, the very Trees and Plants did not escape us; and that he would not let us proceed in this manner . . . .:Though I caused him to be told over and over again, that we were profess'd Physicians; that all we desir'd was to oblige the People of the Country, by distributing to them our Medicaments *gratis*; and that if we took Draughts of the Plants 'twas purely for our own Instruction, and 'twas what could not possibly do any hurt to any body. He did not value what we said, but threaten'd both the Papas, and all the other *Greeks* of the Town, with the Bastinado. Our Interpreter in vain represented to him, that we were *Frenchmen*, who were come to *Melidoni* out of curiosity to see how the *Ladanum* was gather'd, and that we should be very glad to see the other Rarities of the Country . . . . But our Guide could not be prevail'd on to stir a step, any more than the People of the Place, who trembled like Criminals sentenced to Death. The *Turk* did but laugh at 'em; he caus'd them to tell me, that though indeed he had no power over us, yet he had over the *Greeks*, and he'd make 'em know it: adding that if we were minded to buy *Ladanum*, we need not take the pains to go to the place, for that he would send for some of the best. After which, he repeated his Prohibitions, and charged 'em more especially not to inform us how they prepar'd that Drug. Seeing the Man so obstinate, we e'en went into the Papas's House to pack up our things, and be gone. However, I desir'd they would sell us the Instrument they use in gathering the Ladanum. It is a sort of Whip with a long Handle, with two Rows of Straps, as you see it represented in the Figure. The poor Greeks were so intimidated with the Waiwod's menaces, they did not dare to sell it without his leave. We whisper'd 'em to bring it privately, and put it under the Garden-Gate; say what we would to 'em, it signify'd nothing, such an Awe had the Officer over 'em.

"While this was passing, a Messenger came to us from a Papas, who happen'd to break a leg some few days before: we told him what he was to do to get cured, and then went back to our People. The other Papas, who was at the bottom of all this, came and told us with a pleasing Aspect, that he had found out a way to procure us two of those whips, notwithstanding the Prohibition of the *Turk*; that those Instruments were usually sold at two Crowns a-peice, but in regard we were Dr. *Patelaro's* Friends, we

should have 'em for a Crown and a half. I paid him three Crown pieces in presence of the *Turk*, who still continu'd fretting and fuming, teeth outwards. As . . . . for the *Ladanum*-Business, he would himself conduct us a By-way, and the *Turk* know nothing of the matter. Not in the least distrusting this Priest's Sincerity, I assur'd him we would not fail to gratify him for his trouble; and thereupon we took horse and follow'd after him: but we were scarce gone a quarter of a League, e'er the *Turk* came up with us storming like a Fury, threatening the Papas with the Bastinado, and that he would instantly let the Aga of that Precinct know of his favouring of Spies. Our Papas, who was mounted on a very handsome mule, answered him like a Bravo, he might write what he would to the Aga. We went forward on our way, looking out sharp for some curious plant or other; but a while after, this long carrot-bearded Trickster bid our Convoy tell us, that, to serve us, he expos'd himself not only to the Infamy of the Bastinado, but likewise to the Forfeiture of all he was worth. I made answer, we had better go back, for that we should be very sorry to see him a Sufferer in any wise on our account. After some formal Argumentations, it was agreed we should give him three Crown-pieces, one for himself, and a couple to appease the Waiwode. This gave us a suspicion that there was a Fellow-feeling between him and the *Turk*, and that they jointly contriv'd to worm us out of this mony: The *Greeks* have not quite forgot those ways of their Forefathers in this island, which *Plutarch* calls *Cretism*. The Knavery of this Fellow was gross: he had been better paid, and we should have thought him an honest Man into the bargain, if he had gone and given the *Turk* the two Crowns when first he spoke to him, to prevent his writing to the Aga.

"Travelling on towards the Sea, we at length found ourselves among those dry sandy Hillocks, overspread with the little Shrubs that yield the *Ladanum*. It was in the Heat of the Day, and not a Breath of Wind stirring; Circumstances necessary to the gathering of *Ladanum*. Seven or Eight Country-Fellows in their Shirts and Drawers were brushing the Plants with their Whips; the Straps whereof, by rubbing against the Leaves of this Shrub, lick'd up a sort of odoriferous Glue sticking on the Leaves: 'tis part of the nutritious Juice of the Plant, which sweats through the Texture of those Leaves like a Fatty Dew, in shining Drops, as clear as Turpentine.

"When the Whips are sufficiently laden with this Grease, they take a Knife and scrape it clean off the Straps, and make it up into a Mass or Cakes of different size: this is what comes to us under the name of *Ladanum* or *Labdanum*. A Man that's diligent will gather three Pounds two Ounces *per* day, and more, which they sell for a Crown on the spot: this sort of Work is rather unpleasant than laborious, because it must be done in the sultry time of the Day, and in the deadest Calm; and yet the purest *Ladanum* is not free from Filth, because the Winds of the preceding days have blown dust upon these Shrubs. To add weight to this Drug, they knead it up with a very fine blackish Sand, which is found in those parts; as if Nature her self was minded to teach them how to adulterate this Commodity. It is no easy matter to discover the cheat, when the Sand has been well blended with the *Ladanum*: you must chew it a good while, to find whether it crackles between the teeth; or else you must strain it after you have dissolv'd it, in order to purify away what has been added to it.

* * *

"In the time of *Dioscorides*, and before, they used to gather the *Ladanum* not only with Whips, but they also were careful in combing off such of it as was found sticking to the Beards and Thighs of the Goats, which fed upon nothing but the Leaves of the Cistus. The same Author has well described this Plant under the name of Ledon."

The method of using the ladanisterion has probably remained as little unchanged as the instrument itself since Tournefort's time. He gives a figure of it in which the arms which carry the straps are less curved than in the modern example and the straps are longer. The extreme width of the ladanisterion in the Kew Museum is 25 inches, the length of the handle is 45, and that of the straps 36–39 inches.

NOTES ON RECENT DONATIONS TO THE MUSEUM OF THE PHARMACEUTICAL SOCIETY.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

(*Continued from p.* 41.)

IV.—MEDICINAL PLANTS USED BY THE CREE INDIANS, HUDSON'S BAY TERRITORY.

Mr. Walton Haydon, who has resided for some time in the Hudson's Bay Territory, recently presented to the Pharmaceutical Society a series of specimens of the drugs used by the native Indians, and with them has also contributed some information concerning their uses, which may be of interest in the future if placed on record. Only the native name of some of the drugs is known at present, but Mr. Haydon has promised to forward specimens of the plants from which they are obtained on his return to Hudson's Bay.

The remainder I have been able to identify.

POW-E-MEN-ARTIC (Fire Root, or Bitter Pepper Root).—This is the rhizome of *Acorus Calamus*, L., or a nearly allied species, and is used in coughs. The rhizome is rather more slender than met with in this country, being only about one third of an inch in diameter, but seems to be quite as aromatic and pungent. It is not a little singular that there is hardly a country where this plant grows that the rhizome is not used in medicine.

WAYAKASH?—This is the liber of the bark of *Abies Balsamea*, Marshall, freed from the periderm and leaving exposed the numerous vesicles in which the Canada balsam is secreted. The bark is about one line thick, has a short fracture, and is of a white colour when broken; the inner surface is pale brown and the exterior reddish brown. The taste is astringent and bitter, with a flavour of Canada balsam.

WAKINAKIM, the bark of *Juniperus communis*, L.—This is used to make a poultice for wounds. According to Mr. Haydon it is prepared for use by taking a stick and cutting it into pieces about four inches long, boiling it until the outer bark comes off easily, scraping off the inner bark and beating it between two stones into a pulpy mass, which is applied to the wound. Mr. Haydon has seen it so used, and remarks, "It certainly seems to clear a foul wound well, and is the usual remedy employed by Indians for wounds of all kinds." The beneficial

action of the bark is doubtless due to its great astringency, and to the volatile oil present in it, which would naturally act as an antiseptic.

MILAWAPAMULE, *Cornus Sericea*, Herit. (Red Willow Bark).—This bark occurs in two qualities, one being in the form of slender quills, 3 or 4 inches long, bearing a slight resemblance to the bark of *Rhamnus Frangula*, but free from scars. The transverse fracture is yellowish white, the inner surface light orange brown, and the exterior of a deep chestnut brown colour, but when fresh of a bright crimson; the taste is bitter and the flavour resembles that of tea. The second quality consists of fine scrapings of the young bark. The latter is the form in which the bark is used as an emetic in coughs and fevers. For coughs the bark is boiled in water and the decoction strained and given while still warm in the dose of a wineglassful every few minutes until vomiting supervenes. For colds and fevers a teaspoonful of the decoction is taken occasionally. The scraped wood is also smoked, mixed with tobacco. Boiled with rust of iron it is used as a black dye.

NEPATIHE, or Green Alder.—This is the bark of *Alnus viridis*, DC. It consists of thin shreds which have evidently been scraped off the young branches. The inner surface is of a pale dull brown and the exterior greenish brown. It has a very astringent taste with a slight bitterness and a flavour recalling that of the leaves of *Arbutus Uva-ursi*. It is used in dropsy.

METOOS (*Populus*, Sp.?) Poplar Bark.—This bark is in the form of thin flat strips of liber about half an inch wide and half a line thick. It has a bitter, slightly mucilaginous taste with some astringency, and a fibrous texture. The colour externally is dull brown and on the inner surface yellowish. Another form of the bark consists of thinner pieces torn into fine shreds. It is used in coughs, half an ounce, in the form of decoction, being the dose.

The inner bark of the poplar is eaten in the spring by the Indians, and is considered to act as a mild purgative. Mr. Haydon says he has eaten pounds of it without any effect being produced. It is at that time of the year pleasant in flavour, being sweetish and very tender.

WETCHUS-Y-USK-WA, or Service Tree, (*Pyrus*, Sp.?) —This is in the form of thin shreds scraped off the young branches. It is of a yellowish-white colour on the inner surface, and of a purplish-brown on the outer. It has a slightly bitter, very astringent taste, and a strong tea-like flavour. It is used by the Indians in pleurisy and inflammatory diseases.

WE-SUK-A-PUP (*Kalmia angustifolia*, L.), Bitter Tea.—The twigs with leaves and flowers are used in bowel complaints and as a tonic. A small handful is boiled in two pints of water, and a teaspoonful taken occasionally. A nearly allied species, *K. latifolia*, is said to have cured an obstinate case of diarrhœa. In this instance an ounce of the leaves was boiled in eight ounces of water down to four ounces, and thirty drops of the decoction were given four times a day. When given six times a day this quantity caused vertigo. A case of poisoning from the use of *Kalmia latifolia* is on record, in which glowing heat in the head, loss of sight, coldness of extremities, were followed by nausea and vomiting (*Edinburgh Med. Journ.*, 1856, p. 1014), and subsequently formication, weakness of the limbs and great prostration of the circulation, remaining for several hours. It is pointed out in the United States Dispensatory (p. 1678) that *K. angustifolia* most likely possesses similar properties. It is remarkable, therefore, that it should be used as a tonic by the Cree Indians. The coldness of the climate may, however, modify the development of the poisonous principle, and species closely allied to a poisonous one are not always poisonous, as in the case of *Aconitum heterophyllum*, or even *A. paniculatum*, the latter nearly resembling the poisonous *A. Napellus*. Among other drugs mentioned by Mr. Haydon as being in common use by the Cree Indians are—Cedar leaves (*Juniperus Virginiana*?) and *Galium boreale* as diuretics; *Actæa spicata*, L., and *Iris versicolor*, L., as purgatives; *Mentha canadensis*, L., in the form of tea, as a stomachic; *Lobelia Kalmii*, L., as an emetic; *Solidago Virgaurea*, L., as a tonic; Fleabane (*Erigeron Canadensis*), L.?), in diarrhœa; the herb of *Prunella vulgaris*, L., is chewed for sore throat.

KARKAR-PUKWA or Country Tea (*Ledum latifolium*, L.).—The fresh leaves are chewed and applied to wounds. The flowering tops are used as tea, and should be gathered when in full bloom. The dried flowers have an odour between that of tansy and chamomile. According to the United States Dispensatory the leaves are esteemed pectoral and tonic, and are said to have been used as a substitute for tea during the War of Independence. An account of the medicinal uses of this plant by the Indians of the North of Michigan will be found in the *Pharm. Journal.*, [3], viii., p. 850. By homœopaths it is used as a remedy for tender feet, especially when associated with rheumatism, and the tincture is highly esteemed for relieving the pain of the stings of insects.

Betula alba.—The white rotten wood of this tree is boiled in a decoction of *Ledum latifolium* for an hour. The wood is afterwards dried, rubbed to powder and sifted. In this state it is used for chafed surfaces, the flesh being washed with cold water and the powder then sifted on it. Mr. Haydon speaks highly of its value for this purpose, having had personal experience of its efficacy on chafed feet, etc. It is also used as a dusting powder for children.

Prunus virginiana, L.—The bark is used fresh, as a rule. It is used as a cure for diarrhœa. For this purpose a handful of the bark is scraped off a young bough and boiled in about a pint of water and a wineglassful used as a dose.

Castoreum is used to make a poultice for sprains.

Other plants used in medicine by the Cree Indians are *Apocynum hypericifolium*, Acit., and *Comandra livida*, Rich.

Leaves and barks used as an application to wounds are always chewed before being used. Emetics and purgatives are taken in the form of a decoction, a wine glassful is administered occasionally until the desired effect is produced.

Vermilion is also used in medicine, and the method of using it is as follows:—It is mixed with gunpowder damped and lighted, the patient sitting in a closed tent and inhaling the fumes.

Although the list of materia medica is a small one there is remarkable judgment shown in the choice of remedies. Thus, *Prunella vulgaris* makes an excellent substitute for *sal prunella* balls in sore throat, and the bark of the juniper and Canada balsam tree are doubtless as good an application to wounds as a people unversed in antiseptic applications and ignorant of the existence of bacteria could devise. The use of a *Lobelia* as an emetic and of *Iris versicolor* as a cholagogue and purgative approaches closely to

the practice of more civilized nations. The simple device of bleeding from an artery by piercing it with a sharp flint and stopping it by pressure with a button of wood and a bandage shows a respectable knowledge of surgery.

ALOES.*

BY DR. SQUIBB.

Climate and locality have much to do with the quality of the aloes of the markets, and there is almost as much difference in quality in different lots of socotrine aloes as there is difference in kind between Cape, Barbadoes and Curaçoa. The broad general fact is that the aloes which reaches the markets from Bombay, Muscat, Aden, Zanzibar and other shipping ports and places of production embraced within the range from Bombay to Zanzibar, is all called socotrine aloes. The island of Socotra lies about midway of this range, but probably yields a very small proportion of the aloes;—and there is even some doubt, according to Bentley and Trimen, whether this island really gave the name to this kind of aloes, or to the species of plant supposed to yield it. These excellent authorities call the species "Aloe succotrina," quoting "Aloe succotrinum" as the name of this drug used in the tenth century, which name C. Bauhin derives from succus citrinus, or yellow juice. They, however, state that succotrina "is more probably a corruption of socotorina, or socotrina, from the island."

The other general class or kind of aloes of the markets comes principally from Southern Africa and the West India islands.

There is a broad general difference in the mode of preparation of these two classes or kinds of aloes, and quite as broad a difference in therapeutic action, and it is highly probable that this latter difference is due as much to the mode of preparation as to the species of plant yielding it, or to climate, soil, etc. The East Indian aloes is comparatively mild and gentle in operation, requiring larger doses, and is tonic and stomachic in local and general effects.

The South African and West Indian aloes is more active and prompt in smaller doses, and is often drastic and irritant, causing more griping in its action and leaving a local and general atonic condition. The first kind, or socotrine aloes, is alone adapted to human beings, whilst the other kinds are much better adapted to veterinary uses.

The broad distinction in the mode of preparation is that the East Indian kinds are all inspissated or concentrated from the juice as it exuded, by exposure to the heat of the sun, and as the plant itself elaborates its juices in this heat, the exuded juices are but slightly changed by it, otherwise than to lose water and acquire greater consistence. And these juices reach the markets in almost all grades of consistence, from that of syrup to that of a brittle solid. Of late years the liquid and semi-liquid consistence are more rarely met with, the condition of a nearly brittle solid in cold weather and of a soft solid in hot weather being more common with the best qualities. Toward the centre of the packages,—or throughout if in tin cases,—the aloes is a soft solid, or a scarcely movable liquid.

The aloes from Southern Africa and the West Indies, and all the kinds excluded by the Pharmacopœia, are inspissated by boiling, and this boiling down of the juices is generally done in a rude and careless way, often with a very prolonged application of the heat, and the heating badly regulated.

Of late years small specimens are occasionally seen of West India aloes which have been inspissated by the sun, or by some gentle, well regulated method of heating, and such specimens have all the characteristics of very fine aloes, and the therapeutic action is said to be mild and pleasant; but the odour is still very different from that of East Indian aloes.

As an incidental disadvantage from the Eastern method of inspissating the aloe juice it always contains a much larger proportion of foreign matters, such as sand, shreds of aloe plant, splinters of various kinds and sizes, nails, bits of leather, and even the rude implements used for cutting the leaves. The writer once had quite a museum of such odds and ends taken from this aloes by straining. Exposed to the sun in shallow excavations dug in the sand and lined with goat-skins, the blowing in of sand, shreds, etc., to a limited extent is unavoidable, but the proportion varies so much as to leave room for inference that the quantity is often intentional.

This kind of aloes reaches the United States market in barrels, kegs, tubs and boxes. Barrels, kegs and tubs are now becoming more and more rare, these packages belonging to the past times, when it came in a more liquid condition. Although kegs of semi-liquid aloes are still not uncommon, four-fifths of that seen by the writer within the past three or four years has been in cases about the size and shape of claret cases. Occasionally when the aloes is hard, it is found to have been poured directly into the wooden case. But when of the more common consistence this would gradually leak through the joints of the cases in the long transportation through the tropics, and, therefore, as a common rule, the claret cases are tin-lined and soldered, and the getting of the aloes out of these is a matter of difficulty and loss.

The consistence differs so much that any definite description must fail. But the aloes is rather translucent than "opaque;" and although "yellowish-brown or orange-brown," are properly descriptive of a large proportion, an orange-ruby-red, or a reddish-black in masses, is the colour of the better parcels; always "translucent on the edges," and the nearer the transmitted light is to a ruby-red, the better the aloes. This last critical test is equally applicable in the soft state, for then the aloes can be pulled out into a thin film, and the transmitted light will be yellow, orange, or red, and the prevalence of the red tints will generally indicate the finer kinds. But in some parcels where the orange, or even the yellow prevails in the soft state, if the sample be pulled out into thin laminæ and be allowed to dry for a day or so, the colour may change to ruby-red. This circumstance is very useful in selection, because when the tin case of the soft aloes has been standing open for a few days for the inspection of buyers, there will be threads and thin laminæ about the opening which have become dry, and have assumed the final colour. If this colour be red, and the portions be translucent, such a package may generally be accepted as red socotrine aloes; and this the writer regards as the best quality. When such aloes becomes dry and is in hard masses, it is of a reddish-black colour, free from yellow or green tinge, and breaks rather easily, the facets of fracture being small and glassy, and of that kind of a black which is the utmost concentration of ruby-red. In this fracture air cavities are very numerous, so as to render the mass almost spongy at times, and particles of foreign matters are not rare. A resinous and conchoidal fracture are never met with in the writer's experience with socotrine aloes, but are characteristic of the other kinds of aloes which are boiled down. The odour of socotrine aloes is characteristic, but to the writer indescribable. To him it is never "saffron-like," and never fragrant in the sense of a sweet or pleasant smell or a perfume. At its best it is not disagreeable, but perhaps rather agreeable; but very often, if not commonly, it has an element of disagreeable sourness, suggestive of decomposing vegetable juices, and such decomposition is probably its source. This sourish smell, in the London market, seems to condemn some of the very finest of this kind of aloes. At least the writer has not unfrequently bought very fine parcels, said to have been rejected in London on account of this odour.

* From *Ephemeris*, September.

Such aloes has always lost this odour entirely in the process of straining, yielding a very fine purified aloes for powdering. As stated in the U.S.P. "it is almost entirely soluble in alcohol," but the statement that it is soluble "in four times its weight of boiling water," is an error, and in view of its composition the two statements are incompatible.

The aloes is entirely soluble in either alcohol or diluted alcohol when a small quantity in powder is added to a large quantity of the liquid, the impurities of the aloes only settling out. But these impurities are always seen, and are generally seen in considerable proportion, even in the purified aloes. One part of water will dissolve by heat in about five parts of aloes,—that is, they melt together so as not to separate afterward; but it was tried in vain to dissolve the powdered aloes in any proportion of boiling water up to ten times its weight. This solubility in water is therefore, as a test, very misleading, and it seems probable that it is a mistake which has somehow crept into the paragraph of tests. In a hot solution of soap and water the aloes is quite soluble, as are many resinous substances.

Aloes is rarely seen by the physician or pharmacist in the United States in any other condition than that of powder, as it is almost universally bought in powder from the wholesale dealer or drug-miller. Hence the pharmacopœial description of it in masses is not of great importance except to those who have it powdered, and there is good reason to believe that these disregard the description, and too often have it powdered without straining.

Purified aloes was introduced in the U.S.P. revision of 1860, and the other surviving active member of that Committee of Revision will remember what a struggle the writer had to procure its adoption. His museum of curiosities obtained from this aloes and his many years of statistics of the proportion of foreign matters taken out of it, were not convincing until a member of the committee was commissioned to buy a keg of socotrine aloes in the Philadelphia market, have it strained and present the results. The aloes of the markets has improved much since that time, and rare parcels of it are now met with which do not require straining, but as a rule the process should never be omitted. There is no doubt that the process injures the aloes somewhat by the heating, and as knowledge increases in the countries where it is produced, the inducement of higher prices for a better article may yield it to those who are willing to pay for it, and thus save the cost of the straining process.

In alcohol, labour, skill and apparatus, the straining process cannot cost less than about 10 to 12 cents per pound, which sum added to the price at the place of production would pay twice over for the care necessary to keep the juice clean during inspissation. The above formula and process were contributed by the writer in 1860, after having been practised for several years, and they are defective only in one important detail, and that is to direct how fine the "fine sieve" should be. As it stands this is much too indefinite. Through a sieve of eighty meshes to the linear inch, the aloes will not pass with the prescribed dilution, while with a No. 40 sieve too much of the sand will pass. The sand in the aloes being mainly that which is drifted by light winds, is very fine, so that a certain portion of it will pass through almost any sieve, but for practical purposes a No. 60 sieve accomplishes a very good purpose, and takes out all but a small and harmless portion of very fine sand. The proportion of this should, however, be limited by the following simple test which should be applied to all powdered aloes before it be admitted to use.

Dissolve 5 grams or 77·16 grains of the powdered aloes to be tested in 50 c.c. or 1·66 fluid ounces of diluted alcohol,—filter the solution off through a tared filter wetted with diluted alcohol,—wash the filter and the residue upon it with alcohol, until the washings pass colourless, and then dry and weigh them. Subtract the weight of the filter and multiply the weight of the residue by 20. The product will be the percentage of the residue.

If the aloes has been dried and powdered without having been strained the residue will amount to over 5 per cent., generally to 6 or 7 per cent., even when the aloes was of good quality. If the straining has been by too coarse a sieve the residue may reach 3 to 4 per cent. But if through a No. 60 sieve about 2·5 per cent. may be expected.

This residue is partly dust, very fine sand, ground still finer by the mill in powdering, and the detritus of the mill stones; but beside there is a considerable and variable proportion of that kind of vegetable derivative called by Berzelius apothem,—an oxidized extractive matter, largely a result of the heating process. This is tasteless, insoluble and inert, and is neither aloes nor the result of the decomposition of aloes. Roughly estimated, this organic matter in the residues by the above given process of testing, appeared to constitute from 1·5 to 2 per cent. of the powdered aloes, thus reducing the above given percentage as found to about 1 to 1·5 per cent. of foreign matters in the residue from properly purified and powdered socotrine aloes of good quality; or, if less effectually strained, to 1·5 to 2 5 per cent., thus agreeing fairly well with the figures given for the straining process on the large scale, as this does not take out the apothem.

A powdered socotrine aloes of good quality, which, by the above test, does not give over 3·5 per cent. residue, including apothem, leaves no therapeutic reason or use for any of the extracts of aloes, nor for aloin. These may be good substitutes for poor aloes, but not for good aloes.

The amount of impurities strained out of the best grades of socotrine aloes varies very much; and so does the proportion of water contained in such aloes in drying it for powdering. The writer has a record upon these two points which extends over more than thirty years of practice.

During the five years from 1865 to 1869 inclusive, the writer purified and dried for powdering by the above process two hundred and eight packages of socotrine aloes, namely, eighteen barrels, sixty-five kegs, seven tubs, and one hundred and eighteen boxes, containing a total of 21,675 pounds.

From this the residue obtained by straining was 1163 pounds, or 5·36+per cent. The additional loss of water by drying was 2362 pounds, or 10·9−per cent., making a total loss of 16·26 per cent. The maximum loss by straining was about 16 per cent. on several lots, and in a few instances the loss fell to about 2 per cent. The loss by drying varied between 22·1 per cent. on one lot of three barrels of liquid aloes, and 7 per cent. on a very few boxes without tin linings.

During 1883 and to the present time in 1884, about 2111 pounds have been purified and dried, and although the notes are imperfect they indicate a loss by impurities of 5·38+per cent., and by moisture of 14·47+per cent., making a total of 19·85+per cent.

These figures show that although the amount of impurities strained out is about the same as fifteen years ago, the amount of moisture has increased considerably, thus increasing the total from 16·26 per cent. to 19·85 per cent.

The powder from purified aloes is brighter in colour than when made from the same aloes before purification, but the colour of the powder varies much in different parcels, giving no important information as to value. It is always of a dull or tawny yellow colour, and the best varieties have an orange or reddish tinge.

Aloes, though rarely or never used alone, is a very valuable therapeutic agent. Dr. Thomas Hewson, one of the eminent men of a past generation in Philadelphia, and one of the best therapeutists of his day or any day

since, was wont to say to his pupils that when they became practitioners, their skill might be measured by their knowledge of good aloes and how to use it, and this especially in the disorders of females. Few drugs are susceptible of more varied and beneficent uses, while the better grades are but little liable to over action. Always given in combination it yet always acts a principal part. Combined with aromatic powder and soap to render it soluble, especially when given in loose powder, in capsules or wafers, its gentle and tonic action as an aperient is upon the whole alimentary tract, gently stimulating the action of adjacent glands. When its action on the upper part of the canal is to be emphasized, the addition of a small quantity of calomel or resin of podophyllum is commonly advisible. When the whole tract is to be equally impressed it is often combined with senna or colocynth,—the former in females, the latter in robust males.

When the lower or large intestine is to be impressed without disturbing the upper part of the tract, it is best combined with some resin, as mastic or myrrh, in the form of pill. Its solubility is then retarded and so modified that the action can be made to reach the lower bowel especially. Whilst podophyllum, taraxacum and several other agents affect, by a kind of election, the upper part of the canal, and whilst rhubarb, senna and other agents affect prominently the small intestine, aloes is almost the only agent which can be so guarded and guided by skill as to affect prominently the large intestine by the same kind of election. And as the large intestine is that part of the canal where torpidity usually commences, and where it is most persistent,—and that part too, which when obstructed or impacted, obstructs every viscus above it,—it is very important to have an agent which when of good quality and directed by skilful hands may prove a true remedy. It is often said that aloes irritates the rectum, and should never be given when there are hemorrhoids or a tendency to them. But it is probably the prescriber that irritates the rectum by the misuse of aloes, or by the use of the wrong kind of aloes, and by unskilfully adjusted doses. When skilfully used it is highly probable that good aloes never produces griping. Persons are differently susceptible to aloes, as to medicines in general, and the only use in naming a dose is to know what quantity to begin with. About 2 grains of aloes in judicious combination with small quantities of other purgative agents is often sufficient to give the aloetic impression or direction. The officinal pills of aloes, and of aloes and mastic, each contain 2 grains of aloes, and a single pill, repeated at moderate intervals, will often yield the required effect. But the use of aloes cannot be learned from arbitrary doses, because a variation of dose is often the difference between its successful aad unsuccessful use, and sometimes 10 grains may be required.

BEHAVIOUR OF SOME FATS AND LUBRICATING OILS WITH GLACIAL ACETIC ACID.*

BY E. VALENTA.

From a series of experiments, the author infers that most animal and vegetable fats are more or less soluble in glacial acetic acid. Equal parts of oil and glacial acetic acid were intimately mixed in a test-tube and subjected to various temperatures. Olive oil and castor oil are completely soluble at the ordinary temperature (15—20°); palm oil, laurel oil, cocoanut oil, palm-nut oil, illipe oil, olive oil, cacao butter, sesame oil, peach-kernel oil, almond oil, cotton oil, earth-nut oil, apricot-kernel oil, beef tallow, American bone fat, cod-liver oil, and pressed tallow are completely, or almost completely soluble at temperatures varying between 23° and the boiling point of glacial acetic acid, whilst rape oil and mustard oil (cruciferous oils) are imperfectly soluble in boiling glacial acetic acid. The subjoined table gives the results of experiments made with a view to distinguish various fats by heating equal volumes of fat and glacial acetic acid in a test-tube until a clear solution is obtained, allowing to cool, and observing the temperature at which the clear solution is rendered turbid.

Name of fat.	Sp. gr. at 15°.	The solution in equal parts glacial acetic acid (sp. gr. =1·0562) is rendered turbid at	Remarks.
	Vegetable fats.		
Palm oil . . .	—	23°	Fresh fat procured from the Brünn candle works.
Laurel oil . . .	—	26—27°	Old rancid fat from a collection in the laboratory.
Cocoanut oil . .	—	40°	From the laboratory collection.
Illipe oil . . .	0·9175	64·5°	Extracted from the seeds of *Bassia longifolia.*
Palm-nut oil . .	—	48°	Old rancid fat from the English market.
Green olive oil .	0·9173	85°	Oil from second pressing, contains presumably large quantities of olive-kernel oil.
Cacao butter . .	—	105°	Obtained from J. Stettner.
Sesame oil. . .	0·9213	107°	Ditto.
Peach-kernel oil .	0·9241	108°	Crude oil. Hungarian source.
Almond oil . .	0·9186	110°	Obtained from J. Stettner from sweet almonds.
Cotton oil . . .	0·9228	110°	Obtained from J. Stettner.
Olive oil (yellow).	0·9149	111°	Oil from first pressing, obtained from J. Stettner.
Earth-nut oil . .	0·9193	112°	Obtained from J. Stettner.
Apricot-kernel oil	0·9191	114°	Ditto.
	Animal fats.		
Beef tallow . .	—	95°	Hard tallow from Italy.
American bone fat	—	90—95°	
Cod-liver oil . .	—	101°	Obtained from Vienna.
Pressed tallow .	—	114°	Melting point 55·8°. Very hard and pure.

In conclusion, the author mentions that, by the aid of glacial acetic acid at 50—60°, it is possible to detect adulterations of mineral oils with resin oils, the latter being readily soluble in acetic acid, whilst mineral oils are almost insoluble in that solvent.

THE DEPOSITION OF SILVER ON GLASS, ETC.*

BY FRANK L. JAMES, PH.D., M.D.

The advantages of silver over mercurial amalgam as a material for mirrors, aside from the very important one of the health of those who are engaged in the manufacture of the articles, are many. In the first place, when

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carried on properly, with due attention to the recovery of waste, the silvering process is much cheaper than that of amalgam. A strong, brilliant, and lasting coating can be made, when silver is worth 1·15 dollar per ounce, for about 3½ cents per square foot. At St. Gobain the actual cost of material and labour is figured at 36 cents per square metre. Of course, in conducting small operations we cannot hope to arrive at any such results. Another advantage which silver possesses is in point of light. Photometric experiments, instituted and conducted by Liebig, show that 96 per cent. of all light received by a properly silvered mirror is reflected, while the best results obtained with amalgam mirrors show only about 65 per cent. reflected. I quote these figures from memory after a lapse of twenty years, but I am quite sure of their correctness. Objections have been raised to the silver reflection on the ground that it has a yellowish tinge. This defect, if it be one, is easily remedied by giving the glass a slight bluish tint, which will act as a corrigerant of the offending hue. Another method of remedying it is suggested further on. Other advantages of the silvering process will suggest themselves to my readers, not the least of them being the readiness and ease with which it can be applied by every person who has a grain of manipulative skill.

Having thus cleared the way, I will now proceed to a description of methods, and will commence with that of Liebig, but before I do so, I will give the process for preparing glass for silvering, as no matter what process is made use of, the success of the operation depends to a great extent upon the absolute chemical cleanness of the surface which is to receive the metal.

Make a paste of fine whiting, free from grit, or of precipitated chalk, with stronger water of ammonia, and with it cover the surface of the glass. Let it dry on, and when dry brush it off with a soft brush, clean, soft cloth, or with a pledget of perpared cotton. Lay the glass in a suitable vessel (for a small mirror, a saucer will answer), and pour over it dilute nitric acid (1 part of acid to 8 parts of water). If the object has ever been silvered before, or has been coated with mercurial amalgam, the acid should be full strength instead of dilute. In this bath it should remain several minutes and then be rinsed in distilled water, which should be poured on until it comes off without an acid reaction. After rinsing with distilled water the object should be placed in absolute alcohol, and not removed thence until placed in the silvering solution.

As originally devised the formula of Liebig, while yielding most excellent results where laboratory facilities were abundant, presented certain difficulties in manipulation which prevented it from coming into general technical use. It was therefore modified, and is now as follows:—

In 1 pint of distilled water dissolve 38 grains of aldehyde ammonia, and in equal quantity of distilled water 60 grains of nitrate of silver. For use mix the two solutions in equal parts, agitate and filter. The object to be silvered having been previously cleaned, is placed in a suitable vessel and covered with the filtered solution. A gentle heat is now applied by means of a water-bath or otherwise, and the temperature is raised to 120° F. Silver commences to deposit at 122°, and the operation is soon completed. Some little ingenuity may be exercised by the operator in each individual instance as to the best methods of immersing the object. If flat it may be laid in a saucer or suspended on the surface of the fluid; if more than one object is to be silvered and the metal is to be deposited on one side only (as is most generally the case), they may be placed face to face, and a narrow rubber band sprung around the edges.

In Germany aldehyde ammonia is an article of commerce and may be obtained at almost any chemist's. In the United States it is not so common, but may be gotten from dealers in chemicals, especially from those who furnish analytical chemists their supplies of reagents, etc. Aldehyde can be obtained anywhere, and may easily be converted into aldehyde ammonia by passing a stream of dry ammonia gas through it.

Draper's method is almost as simple as Liebig's. It is as follows:—

Dissolve 1 ounce of crystallized nitrate of silver into 2 ounces of pure distilled water. Add stronger water of ammonia until the brown precipitate at first formed is nearly, but not quite, redissolved. The ammonia must be added cautiously and with continued stirring toward the last, as an excess interferes with the successful precipitation of the silver. If by accident so much has been added that the brown precipitate is entirely redissolved, nitrate of silver should be added in solution until a slight precipitate is again formed. Filter and add distilled water to make 6 ounces. This is the silver solution. In 5 ounces of distilled water dissolve 336 grains of tartrate of sodium and potassium (Rochelle or Seignette salts), filter, and add water to make 6 ounces. This is the reducing fluid. To use, mix the solutions in equal parts and proceed as before.

Petitjean, whose method is most in vogue in France and Belgium, has substituted tartaric acid as the reducing agent. His formula is as follows:—

Prepare an ammoniated silver solution the same as in Draper's method. For the reducing fluid dissolve 35 grams of tartaric acid in the same quantity of water as before (*i.e.*, 5 ounces), filter, and bring up to 6 ounces by adding distilled water. For use, mix equal quantities of the fluids and proceed as in former methods. At the great mirror factory of St. Gobain, two baths are used. After allowing the silver to deposit from a bath made as directed above, the mirror is treated to a second bath in which the reducing agent is double the strength of the former (70 grains to 6 ounces of water).

Neither Draper's nor Petitjean's method requires so much heat as has been found valuable in Liebig's process, a temperature of 90° to 110° F. having been found all-sufficient.

Processes might be added by the half-dozen, but no valuable object would be subserved by so doing. The original process contributed by me to the *Journal of Microscopy*, and referred to at the outset of this article, is perhaps the most practical for off-hand use in the laboratory or the workshop. It has the advantage of requiring no artificial heat, of keeping for a very long time, and indeed of improving with age. It is as follows:—

Silvering Solution.—In 1 ounce of distilled water dissolve 48 grains of crystalized silver nitrate. Precipitate by adding strongest water of ammonia, and continue to add ammonia drop by drop, stirring the solution with a glass rod until the precipitate is nearly, but not quite, redissolved. Filter and add distilled water to make 12 fluid drachms.

Reducing Solution.—In 1 ounce of distilled water dissolve 12 grains of Rochelle salts. Boil in a clean, long-necked flask, and while boiling add 2 grains of crystallized nitrate of silver previously dissolved in 1 drachm of distilled water. Continue the boiling for three or four minutes, remove from the lamp, let cool, filter, and add distilled water to make 12 fluid drachms.

For use, mix the two solutions in equal proportions. While a temperature of from 100° to 120° F. hastens the deposition of silver with this fluid, it is by no means necessary, as the metal will separate (though slowly) at a very low degree of temperature.

To avoid the yellow hue referred to above as one of the inherent qualities of light reflected from silver mirrors, there is in addition to the plan suggested, a way of converting the silver deposit into a true amalgam of silver and mercury, and one which is not obnoxious to the indictments brought against mercurial amalgam processes in general. I do not know by whom it was suggested, but a trial of it has convinced me of its practicability even on a large scale. If, after the mirror

has been completed by any of the above processes, a weak solution of the double cyanide of mercury and potassium be rapidly brushed over the silver with a camel's hair pencil, an amalgam is instantaneously formed which adheres firmly to the glass and gives back a perfectly white reflected light.

Having given the most practical and useful of the formulæ for the deposition of silver on glass, I must say something in regard to the subsequent treatment of the mirror thus obtained.

Having secured a film of the desired thickness, the glass should be removed from the silvering fluids before they become entirely exhausted, as otherwise a process of "bleaching" sets up and a portion of the silver is redissolved. On removing the mirror from the solution it should be stood on edge on blotting paper or a porous tile, to drain and dry. If the silvered surface is to be used as a reflecting surface directly (*i.e.*, without the intermediation of glass, as in reflectors for telescopes), it requires a little polishing, and for this reason requires to be somewhat heavier than is needed for mirrors used in the ordinary way. The process of polishing, while a very simple one, requires a deft hand and a light but firm touch. A piece of very soft and clean buckskin, entirely freed from dust by shaking and beating, should be used for the purpose. A small amount of jewellers' rouge or putty powder is placed on it, and the silvered surface should be gone over with regular, light strokes, made with a circular movement. The final rubbings should be done with a similar piece of buckskin or chamois, but without the rouge.

If the mirror is to be used in the ordinary way, nothing remains to be done except to protect the silver deposit. If a battery be handy, the best and most perfect protection is a layer of copper deposited by electrolysis. In the absence of a battery a coat of alcoholic copal varnish surmounted with a coat of red lead answers every purpose. Whatever is used should be carried well over the entire surface and edges of the silver, not only to protect it against scratches, but against the chemical action of atmosphere laden with sulphuretted hydrogen, as is the case in all large cities.

The processes which I have described for the deposition of silver on glass may be applied equally well to its deposition on any chemically clean non-porous surface of organic or inorganic origin. Metals, crystals, horn, shell—in short, any surface that can be freed from adherent grease and kindred impurities may be covered with a film of pure silver by following the details of methods given for glass.

In many instances, however, the film will be imperfectly attached, will not adhere firmly, or will not deposit at certain points. Especially is this the case in porous or semi-porous substances, like wood, leather, flowers, leaves, etc. In such cases success may be obtained by the use of the following, which has been used by me for many years:—Objects of leather, horn, etc., will need no preparatory treatment; but very porous substances, like unglazed earthenware, should receive one or more applications of some filling material, such as copal varnish or water glass, the former being preferable. An alcoholic solution of shellac is also good.

The object to be silvered is immersed four or five minutes in a saturated solution of gallic acid in distilled water, and thence removed into a 2 per cent. solution of nitrate of silver in distilled water. Here it is kept an equal length of time, and thence moved back to the gallic acid solution, the operation being repeated several times until the object assumes a silver grey appearance, due to the deposition of an exceedingly tenuous film of silver on the outer surface and in the minute pores of the object. It is now rinsed in the clear water and laid on bibulous paper on a clean tile to dry. In the meantime prepare the following solutions:—

1. *Reducing Solution.*—Grape sugar or honey, 5 parts; quicklime (CaO), 2 parts; tartaric acid, 2 parts; distilled water, 650 parts. Mix, dissolve, and filter. [To those not acquainted with chemical manipulation, I would suggest the *modus operandi*, as follows:—Dissolve the sugar or honey in a large part of the water, and add the quicklime. In the course of a few hours the lime will be nearly or quite dissolved. In the residue of the water dissolve the tartaric acid, and mix the two solutions. Let stand for a few hours and then filter or decant.]

2. *Silvering Solution.*—Dissolve 20 parts of nitrate of silver in 650 parts of distilled water, add stronger water of ammonia cautiously, with constant stirring, until the precipitate is nearly, but not quite, redissolved. Filter, and preserve in glass-stoppered bottles.

The reducing solution should be kept in bottles filled to the cork and tightly stoppered, to protect from the action of the atmosphere.

For use, mix equal parts of the two solutions, and, after thorough agitation, filter. The object having been prepared as directed above is removed in a gutta percha or japanned dish deep enough to allow of its complete submergence, and the mixed and filtered fluid poured over it. The dish and contents are set in the sunlight or by the fire, and, under favourable circumstances (with a bright, hot sun), decomposition of the fluid commences almost immediately, the silver precipitating and attaching itself to the prepared object with great firmness and brilliancy. The rapidity of decomposition is determined by the amount of light and heat after silvering; the object should be washed in solution of carbonate of lime, rinsed and dried. Glass, porcelain, and earthenware articles need not undergo the preliminary treatment.

Where battery facilities are convenient, there are a number of processes for plating organic substances which may be made use of. All of them are based upon the principle of rendering the surface to be plated a good conductor of electricity. This is generally done by immersing the object to be plated in a solution of some easily reducible metallic salt, and keeping it there until more or less of the solution has absorbed into the surface pores. The absorbed salts are then decomposed by the chemical reagent, which sets them free in an extremely divided form, and, thus deposited throughout the surface structure of the object to be plated, it virtually acts like a continuous surface. From their instability in solution or ready reducibility the salts of silver are generally used. The processes resorted to in the arts in France, Germany, and Italy are Ore's and Cazeneuve's.

In the latter most excellent results are obtained, as follows:—Dissolve 40 parts of crystallized nitrate of silver in 1000 parts of wood spirit. Macerate the object in the solution until sufficient absorption has taken place. The length of time required for the result is variable, and only to be determined by experiment, the horny plates of a beetle, for instance, taking more time than the softer parts or than a piece of leather. There is no danger of leaving the object in the solution too long—or, rather, no harm can be done by an excess of material absorbed. Removing it from the bath, the object is partially dried, by allowing any excess of fluid to drain off, and is then immersed in a solution of ammonia. By this the double nitrate of silver and ammonia is formed, which is an extremely easily reducible salt. The object is now dried and suspended in a close box, in the vapour of mercury. In a few moments the surface is completely covered with a metallic amalgam, and may then be electroplated in the usual manner.

In Ore's method sulphuretted hydrogen is used instead of mercurial vapour. The article, prepared by immersion in silver nitrate dissolved in methylated spirits, is put into a close box and subjected for fifteen or twenty minutes to the actions of the hydrogen sulphide. By this treatment the silver nitrate is converted into silver sulphide. After exposing the object to the air a few minutes, it is transferred to the galvanoplastic bath, and the operation completed by electrolysis. This process is especially applicable to organic material. A human

brain thus prepared several years ago is still in good condition.

In conclusion I would say that I claim nothing new or original in the methods here presented. I have simply collated the results and experiments of others, and having experimented with them, place them before you in a practical form. Every formula here given has been tested and worked by me time and again, and if intelligently followed out, will always yield good results.

THE DETECTION OF ADULTERATED ESSENTIAL OILS.*

BY H. W. LANGBECK.

A problem not unfrequently placed before the chemist is the assay of essential oils, a commercial requirement that challenges all his skill. The author, having for some years past frequently had to examine oil of citronella, found that the product of one Indian firm was always mixed with about 15 per cent. of turpentine, whilst that of another was constantly pure.

Ylang-ylang oil (*Ol. Unonæ odoratissimæ*), purchased by a London house for 8*s.* per ounce at a time when the market price of the oil was 17*s.* per ounce, consisted of a mixture of oil of neroli, partially oxidized oil of bitter almonds and the oils of cardamom, pimento and cinnamon.

A so-called "Algerian geranium oil" consisted of a mixture of French and Indian geranium oil (*Ol. Andropogonis Schoenanthi*).

Various methods have been recommended for the detection of the nature of the sophistication; for instance, allowing a few drops of the suspected oil to volatilize spontaneously from blotting paper, so as to recognize any admixture by the odour, but this test is not applicable to oils containing oxygen.

For a fractional distillation of the oil and an investigation of the condensation products, the quantity of the article to be examined is usually too small.

As shown by Flückiger's practical notes upon the rotatory powers of essential oils, the polaristrobometer does not give trustworthy results, since one and the same oil will exercise a different action upon the ray of polarized light when in a fresh condition to what it does when it has become old. Moreover, a mixture of low priced right and left rotatory oils can be prepared which, being optically inactive, cannot be detected as an adulterant by the polaristrobometer. Further, differences of soil and temperature, as well as the time of the collection of the plants, are often answerable for variations in the rotation by the oil; it is necessary only to refer to the American, German and English oils of peppermint, and the German, English and French oils of lavender.

Hoppe's reagent, nitroprusside of copper, allows perhaps of the detection of sophistications of oils containing oxygen with oxygen-free oils, but not of sophistications of either with one of their own class.

Better results are yielded by the method recommended by Zeller and Hoppe, and worked out by Dragendorff, namely, the greater or less solubility of the pure oils in alcohol and of those mixed with turpentine, copaiba oil, etc. But Dragendorff also pointed out that trustworthy results can be obtained by this method only when working with fresh oils.

About six years since, the author made the observation that salicylic acid is soluble in essential oils, but more freely in oils containing oxygen than in those that do not. Thus, for instance, the oils from plants of the Labiate family dissolve large quantities; those from umbelliferous plants, with a few exceptions, dissolve smaller quantities; and those from plants of the conifer, dipterocarpus and cassia families, very small quantities. In the compilation of the appended table the method of procedure was as follows:—Into each of a number of dry, flat-bottomed test-glasses, about two inches long and five-sixteenths of an inch in diameter, was placed 0·05 gram of salicylic acid. Each glass thus prepared was stuck into a flat cork, to avoid upsetting, and exactly weighed. An oil known to be pure was then added drop by drop and shaken until a clear solution resulted, when the increase in weight found gave the relative solubility. The same oil was then mixed with 5 per cent. and 10 per cent. of turpentine oil, and each mixture tested.

The essential oils as they come into commerce contain almost always small quantities of water, derived from the distillation with steam, and to this moisture is due the formation of more or less hydrogen peroxide according to the length of time an oil is kept. In order to proximately assess this quantity, and thereby to be able indirectly to judge as to the age of the oil, the author used potassium iodide starch paper, in the preparation of which the proportion of 1·0 of starch, 2·0 of potassium iodide and 100·0 of water had been adopted. The oil to be examined is shaken with an equal quantity of distilled water, and after being allowed to settle completely, a few drops of the water are allowed to trickle upon the paper. If the oil is fresh or recently rectified the paper remains white. An older oil produces a more or less intense colour and allows, by comparison with oils of which the age is known, after some practice, tolerably certain conclusions to be drawn. Various essential oils, such as the oil of pennyroyal, peppermint (Hotchkiss), bergamot and turpentine, rectified by the author in June 1882, and preserved with pieces of fused calcium chloride in glass-stoppered flasks, part in direct sunlight and part in a half darkened cupboard, did not colour the iodized paper; they had preserved their characteristic odours, and the peppermint oil had even acquired a much finer smell.

The oils thus preserved remained during the first twelve months remarkably clear and white; a yellowish turbidity then appeared above the pieces of calcium chloride, which at the time of writing had become communicated to the whole of the oil. It should be mentioned that from time to time these oils were brought into use so that the flasks were only partially filled.

The following table has been drawn up as a basis for a more perfect one, to the formation of which other chemists are invited to contribute:—

Name of oil.	Family of plant.	Approximate age.	Turpentine oil added.	Relative solubility.
Ol. Absinthii	Compositæ	One year	—	1 : 17·35
,, ...	,,	,,	5 per cent.	1 : 40
,, ...	,,	,,	10 ,,	1 : 51·85
Ol. Anethi (Germ.)	Umbelliferæ	Fresh	—	1 : 15·75
,, ...	,,	,,	5 per cent.	1 : 20
,, ...	,,	,,	10 ,,	1 : 26·8
,, (English)	,,	One year	—	1 : 12·5
,, ...	,,	,,	5 per cent.	1 : 15
,, ...	,,	,,	10 ,,	1 : 20
Ol. Angelicæ	,,	Six months	—	1 : 48·85
,, ...	,,	,,	5 per cent.	1 : 66·75

* From the *Repertorium der analytischen Chemie*, June 15.

Name of oil.	Family of plant.	Approximate age.	Turpentine oil added.	Relative solubility.
Ol. Angelicæ	Umbelliferæ	Six months	10 per cent.	1:101·35
Ol. Anisi stellati	Magnoliaceæ	,,	—	1: 53
Ol. Anisi vulgaris	Umbelliferæ	Freshly rectified	—	1: 74·7
,,	,,	,,	5 per cent.	1: 94
,,	,,	,,	10 ,,	1:116
,,	,,	Six months	—	1: 70
,,	,,	,,	5 per cent.	1: 81
,,	,,	,,	10 ,,	1:100·6
Ol. Opii graveolentis	,,	Fresh	—	1: 58
,,	,,	,,	5 per cent.	1: 75·75
,,	,,	,,	10 ,,	1: 84
Ol. Basilici	Labiatæ	,,	—	1: 13·65
,,	,,	,,	5 per cent.	1: 31·15
,,	,,	,,	10 ,,	1: 45
Ol. Bergamottæ	Hesperideæ	Freshly rectified	—	1: 30
,,	,,	,,	5 per cent.	1: 36
,,	,,	,,	10 ,,	1: 42
,,	,,	One year	—	1: 17
,,	,,	,,	5 per cent.	1: 22·5
,,	,,	,,	10 ,,	1: 36
Ol. Cajeputi	Myrtaceæ	,,	—	1: 10
Ol. Calami	Dipsaceæ	,,	—	1: 15
Ol. Eucalypti	Myrtaceæ	,,	—	1: 13
Ol. Carui	Umbelliferæ	,,	—	1: 85
Ol. Caryophylli	Myrtaceæ	Freshly rectified	—	1: 56
,,	,,	,,	5 per cent.	1: 68
,,	,,	Two years	—	1: 25·5
Ol. Cassiæ	Lauraceæ	One year	—	1: 7·7
Ol. Citri	Hesperideæ	Six months	—	1: 80·5
,,	,,	,,	5 per cent.	1:104
,,	,,	,,	10 ,,	1:125
Ol. Citronellæ	Gramineæ	One year	—	1: 10
,,	,,	,,	5 per cent.	1: 19
Ol. Copaivæ	Leguminosæ	Freshly rectified	—	1: 95
Ol. Coriandri	Umbelliferæ	Two years	—	1: 84
Ol. Dracunculi	Compositæ	Fresh	—	1: 17·7
Ol. Foeniculi	Umbelliferæ	One year	—	1: 31
Ol. Gaultheriæ (Wintergreen oil)	Ericaceæ	Fresh	—	1: 37·5
Ol. Andropogonis (Gingergrass oil)	Gramineæ	One year	—	1: 14
Balsam Gurgun	Dipterocarpeæ	One year	—	1: 108
Ol. Juniperi ligni	Cupressineæ	One year	—	1: 130
Ol. Lavandulæ (Mont Blanc)	Labiatæ	Fresh	—	1: 12
Ol. Majoranæ	,,	Two years	—	1: 17·6
Ol. Melissæ citrat.	,,	One year	—	1: 13
Ol. Menthæ crispæ seu viridis	,,	Two years	—	1: 10
Ol. Menthæ piperitæ (Hotchkiss)	,,	One year	—	1: 7
,,	,,	,,	5 per cent.	1: 14·6
,,	,,	,,	10 per cent.	1: 26
Ol. Myristici	Myristiceæ	Fresh	—	1: 31
Ol. Neroli	Hesperideæ	One year	—	1: 13·2
Ol. Pulegii	Labiatæ	Fresh	—	1: 25
,,	,,	One year	—	1: 16
Ol. Rosmarini	,,	One year	—	1: 10
,,	,,	Freshly rectified	—	1: 12·5
,,	,,	,,	5 per cent.	1: 17·65
,,	,,	,,	10 per cent.	1: 24
Ol. Rutæ	Rutaceæ	Two years	—	1: 9
Ol. Saturejæ	Labiatæ	Fresh	—	1: 16·7
Ol. Serpylli	,,	,,	—	1: 18·6
Ol. Thymi (Ptychotis Ajowan)	Umbelliferæ	,,	—	1: 55*
Ol. Valerianæ	Valerianaceæ	Three years	—	1: 15
Ol. Sinapis	Cruciferæ	Fresh	—	1: 58
Ol. Patchouli†	Labiatæ	—	—	1: 35
Ol. Terebinthinæ	Coniferæ	Freshly rectified	—	1:625
,,	,,	Three months	—	1:540
,,	,,	For two years exposed to direct sunlight	—	1:159
,,	,,	Partially resinified	—	1: 94

* The oil contained nearly no Thymol.

† The sample was certainly adulterated, as no genuine oil was at hand no comparison could be made.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the ransmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelop s indorsed "Pharm. Journ."*

THE REPETITION OF PRESCRIPTIONS.

LAST year an action for damages was brought against a Paris pharmacien, who had continued to dispense for a married woman a prescription ordering morphia until, according to the plaint of the husband, the customer had through the facilities thus afforded contracted the morphia habit and seriously injured her health, and the adverse judgment attracted considerable attention at the time, not only from French pharmacists, but also from the members of the medical profession. The decision of the two Courts that heard the case was based upon an interpretation of decrees in force relating to the subject to the effect that French pharmacists were under the necessity of demanding from their customers a fresh medical authority every time they dispensed a medicine containing certain scheduled substances, of which morphia was one. The rule laid down would be very far-reaching in its effects, and practically the whole question was raised as to how far a French pharmacist is justified in dispensing any prescription more than once, except under the prescriber's authority. The Paris Society of Legal Medicine, apparently having regarded the case under this wider aspect, was consequently induced to take the subject into formal consideration, and in order that a result might be arrived at that would be satisfactory to all parties, some pharmacists were invited to assist the bureau of the Society in its consultations. The conclusions of the Committee, as formulated in a report that has just appeared, are, notwithstanding the more stringent regulations controlling the practice of pharmacy in France, so much more liberal than those adopted by a portion of the medical press in this country, and so nearly in accord with those which we have expressed in these columns on more than one occasion, that we think it may serve a useful purpose to place them briefly before our readers.

The discussion appears to have been opened by M. MAYET, a member of the bureau, who, while not contesting the legal dictum laid down by the Courts, expressed a strong opinion that it would be inadmissible to impose such an obligation upon pharmacists. The objections recognized by M. MAYET are those that are obvious to every practical observer. It is admitted, for instance, that it would be unreasonable, and in many cases useless, to require a patient to incur the expense of obtaining a fresh prescription every time a supply of medicine is required. Moreover, in cases where the patient resides at a distance from the doctor or is travelling, such medical supervision of the prescriptions would be impracticable. Taking into consideration, therefore, these and other difficulties, and the fact that the liberty which has been allowed to pharmacists by the somewhat lax reading of the law that has obtained hitherto has only rarely led to accident, M. MAYET thought the Society would not be desirous that the regulations upon the subject should be applied more stringently, but that it would recognize the right generally of pharmacists to repeat prescriptions, with the exception of those containing the more potent articles of the materia medica. It was argued that the decision in the case under consideration showed that the law was strong enough to deal with any cases in which the relaxation was improperly abused. Broadly speaking these views were hardly contested by any member of the Committee. The President called attention, however, to the prevalence of the morphia habit in some countries, suggesting that something special should be done to prevent the spread of it in France, and this idea was evidently held by some of his colleagues. Eventually the Committee formulated its views in three recommendations which it submits the Society should put forward with no other pretensions than as counsel to medical men and pharmacists alike. These recommendations are:—(1) That in prescribing a medicine capable, either through mistake or abuse, of causing toxic accidents, the prescription should bear not only the quantity prescribed of the toxic substance and the mode of its administration, but whenever it is possible an indication of the maximum number of times it may be dispensed without receiving a new *visa* from the prescriber; (2) that every time a pharmacist dispenses such a prescription, although it may be one that he has already registered, he should stamp and number it afresh; and (3) that prescriptions containing solutions for hypodermic injection should not in any case be renewed without authorization from the medical man from whom they emanated.

It will be seen, therefore, that this Committee of a medical society advocates a course which would to a considerable extent throw upon the prescriber the onus of placing a limit upon the number of times a patient shall be able to obtain supplies of a medicine that it might be hurtful or undesirable for him to use in indefinite quantities. So far this is practically in accord with views that we have more than once expressed on the question. Whether the strong sense of property attached by consultees in this country to prescriptions for which they consider they have paid their money,—a feeling which has received judicial endorsement in France—would

not defeat all attempts to establish such a practice throughout Great Britain, is an open question, and certainly the trial might involve imputations respecting the multiplication of fees that would be the reverse of pleasant. But if the medical practitioner shrinks from limiting, even in the interest of his patient, the force of a prescription, because the consequences may be disagreeable, it can hardly be expected that the pharmacist will take up the lapsed duty. Indeed, such a course might on many occasions lay him open to well deserved censure for meddling with affairs outside his proper province. Of course we do not mean to argue that in this, any more than in other phases of his dispensing duties, the pharmacist is to act as a mere automaton and not to exercise any discretion with respect to prescriptions; nevertheless, his interference should be limited to dealing with emergencies overlooked or not foreseen by the prescriber. But with respect to the person upon whom the responsibility devolves of deciding as to the force and duration of a prescription, we do not know that we can better or more concisely express our views on the subject, or show how they agree with those just put forward by the Société de Médecine Légale, than by quoting a sentence written on a former occasion when discussing this subject. "If a physician desires that the medicine ordered in "prescriptions shall not be dispensed more than "once without direct authority from himself, he "must establish that position as a compact between "his patient and himself, and must, moreover, place "in the hands of the dispensing chemist adequate "means of enabling him to justify a refusal to repeat "a prescription, either by authorizing him to retain "possession of the prescription, or by writing upon it "that the medicine is to be dispensed only once "without further directions from the prescriber." It will be observed that the French medico-legal Committee by the terms of its third recommendation, excepts all solutions for hypodermic injection from the ordinary rule that it would lay down as to potent medicines generally, and recommends that prescriptions ordering them should never be repeated without a fresh authorization. But we think that the exception is illogical and would prove inconvenient; for whilst there does not seem to be any sufficient reason for treating this class of prescriptions differently from other ordinary potent medicines, it is notorious that, rightly or wrongly, patients are not unfrequently initiated by their medical advisers into the self-administration of these remedies, presumably that they may use them *pro re natâ* without a medical consultation.

According to the *Sanitary Engineer* the poisoning of an entire family in New York, which had created a considerable sensation on account of it having been attributed to the eating of canned salmon, upon investigation by the sanitary officials proved to have been due to the use of a solution of sugar of lead in mistake for white vinegar.

The General Council of Medical Education and Registration met on Tuesday of last week for the first time since the withdrawal of the Medical Bill, when Sir Henry Acland was re-elected President for another term of five years.

* * *

On Friday, the 10th inst., the Pharmacopœia Committee presented a report to the Medical Council. It stated that since the meeting of the Council in March last, the Committee had held one meeting and the Sub-Committee one meeting. At the meeting of the Committee, which was held on the 20th of June, it had had a summary of suggestions received in reply to the circular sent out under consideration, with the assistance of the Editors, Professors Redwood, Bentley and Attfield, and instructions had been given to the Editors to expedite as much as possible the preparation of the new edition of the Pharmacopœia. Professor Redwood had informed the Committee that considerable progress had been made with the work, especially with regard to the portion relating to such new substances and their preparations as had received the sanction of the Committee for their introduction, but that in reference to these much more work remained to be done. He had, however, assured the Committee, on behalf of himself and his colleagues, that the utmost expedition should be used in the preparation of the work. The report also announced that the stock of copies of the present edition is now exhausted. The discussion on the report, which was adopted, does not seem to have been a very important one, turning principally upon the grievance that the one meeting of the Committee had been brought to a conclusion earlier than was expected, and in the absence of two representatives from Ireland, producing on the mind of one of them the impression that the latter part of the business had been "scamped."

* * *

On the occasion of the distribution of prizes and certificates to the successful students of the Central School of Science at Derby last Tuesday, Sir William Harcourt, speaking of the desirability of the cultivation of science and of the material assistance which scientific discoveries have given to the development of this country, expressed himself to the effect that he should be sorry to recommend the study of science entirely from a utilitarian point of view. It is not very evident why this should not be done, since there are, we think, many circumstances connected with our manufacturing industries which would fully justify a specially utilitarian study of science. To use the words of Sir W. Harcourt, these are not days when we can afford to be idle or ignorant, and we may add that that they are not days when we can afford to regard science as mainly an intellectual entertainment, which may chance to lead to practical advantage or to go on in the old happy-go-lucky manner, if we are to hold our own with countries where scientific education is of a far more complete character than anything we have in this country.

* * *

The new session of the Yorkshire College of Science, commenced last Monday, is marked by the opening of a portion of the new building which is being erected from the designs of Mr. Waterhouse. It will also be the first session in which the Leeds School of Medicine and the College will work together in full and complete union. The chemical

theatre, in which Professor Thorpe lectures, is 60 feet long by 40 feet wide and will accommodate three hundred students. A view of the buildings and an interesting account of the College is given in the *Leeds Mercury* for Saturday last.

* * *

In a paper that appeared in the *American Druggist* for July, the writer, Mr. H. Maclagan, alleged that the green colour of extracts of *Cannabis indica* is not natural, but due to an accidental or intentional contamination with copper, and that the extract cannot be made of a green colour without this contamination. The paper has given rise to some protest and caused considerable uneasiness. Dr. Squibb, remembering that *Cannabis indica* seeds are rich in oil, which might be split up in the presence of a metallic oxide, and that oleate of copper is an intensely green salt, was induced to examine extract of his own manufacture, to ascertain whether there was in it any basis for the statement. This extract had only been in contact with copper during the recovery of the alcohol by distillation, whilst special care was taken that the copper should be bright and free from oxide; but copper was distinctly found in it, though in exceedingly minute quantity. In order to test the assertion that the extract cannot be of a green colour without the contamination of copper, a sample was prepared, substituting a glass retort for the copper still in distilling off the alcohol. The finished product, when tested, gave no trace of copper, and in mass was of a fine dark green colour, not differing perceptibly from that of the extract containing copper. Nevertheless, when spread out in very thin layers the extract free from copper had a slightly yellower or browner tinge than the contaminated extract, and it was observed that this difference was developed during the last stages of the evaporation. Although, therefore, condemning Mr. Maclagan's paper as misleading to an unusual degree, since a deep green colour is natural to any well made extract of Indian hemp, Dr. Squibb concludes from his experiments that the presence of a small quantity of copper does prevent or retard change of colour in the chlorophyll during the evaporation.

* * *

From a Government return issued within the last few days it appears that in the year 1882, 19,519 human beings lost their lives through the bites of venomous snakes in the presidencies and provinces of British India alone. This is a higher number than any reported in the previous seven years, but the increase may be more apparent than real and due to the returns from outlying districts being more complete. The highest number of deaths is reported from Bengal, 9191; next come the North West Provinces and Oudh, with 5680, Bombay with 1190, the Central Provinces with 1058, the Punjab with 929, and Madras with 920. During the same year rewards amounting to £1487 were paid for the destruction of 422,421 snakes.

* * *

On Monday last a "Medical, Pharmaceutical and Kindred Professions and Trades' Exhibition" was opened in Humphrey's Hall, Albert Gate, Hyde Park. It contains a number of exhibits of specialties and other articles of more or less interest to pharmacists, and will well repay the trouble involved in a visit. The exhibition is to remain open until the 12th of November, and part of the proceeds will go to the University College Hospital.

Pharmaceutical Society of Ireland.

ANNUAL MEETING.

The Ninth Annual Meeting of the Pharmaceutical Society of Ireland was held at No. 11, Harcourt Street, Dublin, on Monday, October 6, 1884, at four o'clock p.m. The chair was taken by the President, Mr. J. E. Brunker, M.A.

The following seven members of Council retired by rotation (all of whom were eligible for re-election):—Robert Simpson, James Edward Brunker, M.A., Robert Montgomery, M.R.C.S.E., L.A., Dub., Richard Ward Pring, L.A., Dub., William F. Wells, Jun., Thomas Collins, M.R.C.S.E., L.A., Dub., Edward M. Hodgson, and they presented themselves for election accordingly. The following member was also a candidate for a seat on the Council:—William Harrington, M.P.S.I., 80, Patrick Street, Cork.

The President, in addressing the meeting, said: In giving a short *résumé* of the affairs of the Society for the past year, I think I may to some extent congratulate you on having made some progress. Though I cannot say the Society has advanced by "leaps and bounds," and though I have to regret that some objects which we had in view at this time last year have not yet been accomplished, there are some satisfactory points in our present position. In the first place the number of candidates who have presented themselves for examination for your licence shows a considerable increase on the previous year. In 1882–83 the numbers were—

	Candidates	. 17		Passed	. 13
1883–84	„	. 34		„	. 30

I notice, however, that the number of young men presenting themselves for the Preliminary examination does not show a similar increase, there being a falling off in this respect—

1882–83	Candidates	. 44		Passed	. 37
1883–84	„	. 25		„	. 20

This would be a rather serious circumstance if it were not that other examinations are accepted in lieu of our Preliminary, and so besides the large number of young men who have already passed our Preliminary examination, a good many others may be expected in course of time to present themselves for the licence of our Society. Next with regard to the examinations themselves. The Council have given some attention to increasing their efficiency, and in this they have been well supported by the examiners. The examination for the licence is now extended over three days, and is made more practical and searching than before; and I can safely say that gentlemen who obtain our licence are fully qualified to take their places amongst the pharmacists of the United Kingdom. I do not mean to say that we have yet reached, or nearly reached, the high standard required for the Major qualification in Great Britain, but we are able to supply men fully qualified to supply the wants of a comparatively poor country, and have fixed a standard quite as high as the existing educational opportunities of the country will admit of. We cannot yet afford to support Schools of Pharmacy such as are to be found in the sister kingdom; and there is an almost total absence of general technical schools in which our young men could avail themselves of practical instruction in chemistry and physics. I regret that the hope of legislation on the subject of the sale of poisons, which this time last year appeared to be within measurable distance, has been disappointed. After our interview with the Chief Secretary in February last, we had good prospects of legislation on the subject during the past session; but the good intentions of our legislators upon this, as on many other practical matters, have come to nothing. Until something is done to bring the retailers of poisons under some control, not only will the position of the pharmacist be unsatisfactory, but the safety of the public will be seriously endangered

Personally, I regret the decision of your Council with reference to the licensing of druggists for the sale of poisons (other than those whose rights are reserved under our Act), because I consider that the licensing of such men, with proper safeguards as to their education and practical knowledge, would be a decided advantage to the public; but that decision having been arrived at, I think we should lose no opportunity of pressing upon Government for power to register those whose rights are reserved under our very imperfect Act and so bring them under some surveillance. Other matters aimed at in Parliament during the past session have fallen through, such as the regulations affecting the sale of patent medicines containing poisons. On this subject a Bill was actually prepared by Government; and your Council strongly urged the extension to Ireland of any legislation on the subject which might be proposed for England. In connection with the Medical Acts (Amendment) Bill which engaged so much attention last session, we have joined the Pharmaceutical Society of Great Britain in urging upon Parliament and the Government the claim of the pharmacists of these countries to a responsible share in the preparation of the National Pharmacopœia. I will not touch upon financial matters, which will be fully treated on by your Honorary Treasurer, further than to refer to a lacuna which you will find in the balance to credit of the Society at close of the year. You will all share with me the regret which I must express that our late Registrar, in whom we reposed great confidence, should have so disappointed us. We have obtained some property as a set off for the deficiency, which will, we hope, be realized in course of this month; but we cannot say whether it will cover all that has been lost. We have selected from a large number of candidates a gentlemen who will, I believe, fill the position with credit to himself and the Society. While touching on financial matters, I must express the obligation which the Society is under to the sister Society of Great Britain for the liberal terms upon which they have agreed to supply the *Pharmaceutical Journal* to our members. I believe we have in the first instance to thank the President of that Society for obtaining for us this boon. It will be a considerable relief to our small exchequer, which was too heavily weighted in supplying the paper on the original terms. I regret very much that the evening meetings of the Society have so completely collapsed, and I would strongly urge upon our younger licentiates and on students the importance of availing themselves of such a means of improvement, and would ask them to devote a little of their time to preparing notes on pharmaceutical matters coming under their notice, no matter how simple or elementary. The time will not be ill spent, for the reading of such notes and discussion upon them cannot fail to be interesting and instructive. I shall be glad to renew an offer which I made last year, but which was not taken up, namely, to give a small prize for such notes to be read before the evening meetings of the coming winter by young members or students.

Messrs. Grindley and Edmondson having been appointed Scrutineers of the ballot for the election of members to fill vacancies in the Council for 1884–85,—

The Hon. Treasurer, Mr. Hodgson, then presented his annual account. The balance in bank at commencement of year was £62 10*s*. He regretted that the income from examinations showed a considerable falling off, being only £181 13*s*., compared with £212 2*s*. for the preceding year. Members' subscriptions amounted to £53 11*s*., precisely the same as last year. Amount of stock sold to defray cost of furnishing the Society's new rooms came to £159 18*s*. 1*d*. The sum of £15 14*s*. 11*d*. was received as dividends on stock. Other items brought the income for the year up to £474 1*s*. 6*d*. The expenditure included £42 10*s*. 6*d*. to the examiners, £19 19*s*. fees returned, £43 salary to late Registrar, £5 14*s*. 5*d*. postage, £70 for rent, £33 11*s*. 10*d*. for *Pharmaceutical Journal*, £11 5*s*. for office attendant, £12 12*s*. for the reporting of the meetings, £4 1*s*. 11*d*. for stationery and advertising, and £164 17*s*. 2*d*. for furnishing rooms, showing a balance of £56 15*s*. 2*d*. to the Society's credit. He regretted, however, that owing to the misappropriation of the Society's moneys by their late Registrar, the amount in bank was only £17 18*s*. 2*d*., showing a deficit of £38 17*s*. The greater portion of this consisted of members' subscriptions, and on it being observed that an unusual number were still due, Mr. Fennell was instructed to apply for them. He then acknowledged having received subscriptions and fees which he had failed to lodge. He must say that he felt greatly surprised and disappointed. Their late Registrar was about one of the last men he would have suspected of being guilty of such an act, and he deeply regretted that the confidence they all reposed in him should have been so grievously abused. He was unable to say yet how far the little property they had secured from Mr. Fennell would go towards wiping out the deficit; but he might say that on a rough calculation it is estimated that at least £25 will be saved. With regard to the item of £70 for rent the Treasurer wished to point out that that included not only a year's rent for their present rooms, but also six months' rent due to the College of Physicians, so that there will be £20 less to deal with under this head in next account. With regard to the item of £33 11*s*. 10*d*. he was glad to say that there will also be a reduction in this; the Pharmaceutical Society of Great Britain having agreed to supply the Journal to members of this Society for the sum of £20. He certainly thought their best thanks were due to the sister Society for so liberal an action. The legal expenses were small, and he considered that economy should be constantly exercised in regard to them, that they should be borne by those whose interests were directly served.

On the motion of Mr. Hayes, seconded by Professor Tichborne, the Treasurer's account was received.

The Scrutineers of the ballot then submitted their report, from which it appeared that all the outgoing members of the Council were re-elected.

The following were the votes:—

R. Simpson	29
J. E. Brunker, M.A.	33
R. Montgomery, M.R.C.S.E., L.A., Dub	34
R. W. Pring, L.A., Dub.	30
W. F. Wells, Jun.	27
J. Collins, M.R.C.S.E., L.A., Dub.	34
E. M. Hodgson	26
W. Harrington	20

The various officers and Committees having been unanimously re-elected, the proceedings terminated.

Provincial Transactions.

HAWICK PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The usual monthly meeting was held on the 14th inst., when an interesting lecture was delivered by Mr. Dechan, chemist, on "Organic Analysis." At the outset the lecturer gave an account of the progress which had been made, and the improved methods that had been discovered since the early days of the birth of organic analysis. He then detailed the precautions necessary to be observed in analysing an organic body, and practically illustrated the same by the analysis of a sample of sugar. He explained how the carbon and hydrogen were estimated, by the products of combustion being trapped in chloride of calcium tubes and Liebig's potash bulbs. He then entered into a detailed explanation of the methods by which the nitrogen in organic bodies is estimated, the process being illustrated by means of apparatus and diagrams.

At the close, the Vice-President (Mr. Donaldson), who

occupied the chair, proposed a vote of thanks to Mr. Dechan for his lecture, which had been listened to with close attention.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At a meeting of the above Association, held in their room, Church Institute, on Tuesday evening, September 23, Mr. Whitworth, of Shaw, read a very interesting paper on "Pharmacopœias Past and Present," Mr. A. E. Martin, President, occupying the chair.

Mr. Whitworth spoke of the practice in former years of the use of such medicines as oil of bricks, oil of swallows, snails, skinned vipers, etc., and traced the progress of pharmacopœias to the present time, pointing out the gradual disuse of such articles as the above, and the introduction of drugs by reason of their therapeutical action, and not by any superstition that may be attached thereto.

The paper was very interesting throughout, and was followed by a discussion, in which Messrs. A. E. Martin, A. Smith, R. Marlor and B. Swinbourne took part. Mr. Marlor remarked that at the present time he was frequently asked for "mithridate" as an ingredient in cattle medicine.

A vote of thanks to Mr. Whitworth was carried, and closed the meeting.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A special business meeting of this Association was held in the rooms, 14, South Street, Andrew Street, on Thursday evening, the 9th inst., at 9.15. The President, Mr. W. S. Turnbull, occupied the chair.

The chief business was to consider a report by the Committee upon the Revision of the Constitution, Rules and Bye laws. After a short discussion the report was adopted, and the revised Constitution, Rules and Bye-laws ordered to be printed.

Some other matters having been disposed of, it was intimated that the first general meeting of the session will be held on the evening of Friday, October 24, when the President will deliver the Inaugural Address.

The British Association for the Advancement of Science.

STEPS TOWARDS A KINETIC THEORY OF MATTER.*

BY PROFESSOR SIR WILLIAM THOMSON, M.A., LL.D., D.C.L., F.R.SS.L. AND E., F.R.A.S.,

President of the Section.

The now well-known kinetic theory of gases is a step so important in the way of explaining seemingly static properties of matter by motion, that it is scarcely possible to help anticipating in idea the arrival at a complete theory of matter, in which all its properties will be seen to be merely attributes of motion. If we are to look for the origin of this idea, we must go back to Democritus, Epicurus, and Lucretius. We may then, I believe, without missing a single step, skip eighteen hundred years. Early last century we find in Malebranche's 'Recherche de la Vérité,' the statement that "La dureté de corps" depends on "petits tourbillons."† These words, embedded in a hopeless mass of unintelligible statements of the physical, metaphysical, and theological philosophies of the day, and unsupported by any explanation, elucidation, or illustration throughout the rest of the three volumes, and only marred by any other single sentence or word to be found in the great book, still do express a distinct conception, which forms a most remarkable step towards the kinetic theory of matter. A little later we have Daniel Bernoulli's promulgation of what we now accept as a surest article of scientific faith—the kinetic theory of gases. He, so far as I know, thought only of the Boyle's and Marriot's law of the "spring of air," as Boyle called it, without reference to change of temperature or the augmentation of its pressure if not allowed to expand, for elevation of temperature, a phenomenon which perhaps he scarcely knew, still less the elevation of temperature produced by compression, and the lowering of temperature by dilatation, and the consequent necessity of waiting for a fraction of a second or a few seconds of time (with apparatus of ordinary experimental magnitude), to see a subsidence from a larger change of pressure, down to the amount of change that verifies Boyle's law. The consideration of these phenomena forty years ago by Joule, in connection with Bernoulli's original conception, formed the foundation of the kinetic theory of gases as we now have it. But what a splendid and useful building has been placed on this foundation by Clausius and Maxwell, and what a beautiful ornament we see on the top of it in the radiometer of Crookes, securely attached to it by the happy discovery of Tait and Dewar,* that the length of the free path of the residual molecules of air in a good modern vacuum may amount to several inches. Clausius' and Maxwell's explanations of the diffusion of gases, and of thermal conduction in gases, their charmingly intelligible conclusion that in gases the diffusion of heat is just a little more rapid than the diffusion of molecules, because of the interchange of energy in collisions between molecules,† while the chief transference of heat is by actual transport of the molecules themselves, and Maxwell's explanation of the viscosity of gases, with the absolute numerical relations which the work of those two great discoverers found among the three properties of diffusion, thermal conduction, and viscosity, have annexed to the domain of science a vast and ever-growing province.

Rich as it is in practical results, the kinetic theory of gases, as hitherto developed, stops absolutely short at the atom or molecule, and gives not even a suggestion towards explaining the properties in virtue of which the atoms or molecules mutually influence one another. For

* Opening Address delivered before the Mathematical and Physical Science Section.

† "Preuve de la supposition que j'ay faite: Que la matière subtile ou éthérée est nécessairement composée de PETITS TOURBILLONS; et qu'ils sont les causes naturelles de tous les changements qui arrivent à la matière; ce que je confirme par l'explication des effets le plus généraux de la Physique, tels que sont la dureté des corps, leur fluidité, leur pesanteur, leur légèreté, la lumière et la réfraction et réflexion de ses rayons."—Malebranche, 'Recherche de la Vérité,' 1712.

* 'Proc. R. S. E.,' March 2, 1874, and July 5, 1875.

† On the other hand, in liquids, on account of the crowdedness of the molecules, the diffusion of heat must be chiefly by interchange of energies between the molecules, and should be, as experiment proves it is, enormously more rapid than the diffusion of the molecules themselves, and this again ought to be much less rapid than either the material or thermal diffusivities of gases. Thus the diffusivity of common salt through water was found by Fick to be as small as ·0000112 square centimetres per second; nearly two hundred times as great as this is the diffusivity of heat through water, which was found by J. T. Bottomley to be about ·002 square centimetres per second. The material diffusivities of gases, according to Loschmidt's experiments, range from ·098 (the interdiffusivity of carbonic acid and nitrous oxide) to ·642 (the interdiffusivity of carbonic oxide and hydrogen), while the thermal diffusivities of gases, calculated according to Clausius' and Maxwell's kinetic theory of gases, are ·089 for carbonic acid, ·16 for common air or other gases of nearly the same density, and 1·12 for hydrogen (all, both material and thermal, being reckoned in square centimetres per second).

some guidance towards a deeper and more comprehensive theory of matter, we may look back with advantage to the end of last century, and the beginning of this century, and find Rumford's conclusion regarding the heat generated in boring a brass gun: "It appears to me to be extremely difficult, if not quite impossible, to form any distinct idea of anything capable of being excited and communicated in the manner the heat was excited and communicated in these experiments, except it be MOTION," and Davy's still more suggestive statements: "The phenomena of repulsion are not dependent on a peculiar elastic fluid for their existence. . . ." "Heat may be defined as a peculiar motion, probably a vibration, of the corpuscles of bodies tending to separate them. . . ." "To distinguish this motion from others, and to signify the causes of our sensations of heat, etc., the name *repulsive* motion has been adopted." Here we have a most important idea. It would be somewhat a bold figure of speech to say the earth and moon are kept apart by a repulsive motion; and yet, after all, what is centrifrugal force but a repulsive motion, and may it not be that there is no such thing as repulsion, and that it is solely by inertia that what seems to be repulsion is produced? Two bodies fly together, and, accelerated by mutual attraction, if they do not precisely hit one another, they cannot but separate in virtue of the inertia of their masses. So, after dashing past one another in sharply concave curves round their common centre of gravity, they fly asunder again. A careless onlooker might imagine they had repelled one another. and might not notice the difference between what he actually sees and what he would see if the two bodies had been projected with great velocity towards one another, and either colliding and rebounding, or repelling one another into sharply convex continuous curves, fly asunder again.

Joule, Clausius, and Maxwell, and no doubt Daniel Bernoulli himself, and I believe every one who has hitherto written or done anything very explicit in the kinetic theory of gases, has taken the mutual action of molecules in collision as rupulsive. May it not after all be attractive? This idea has never left my mind since I first read Davy's 'Repulsive Motion,' about thirty-five years ago, but I never made anything of it, at all events have not done so until to-day (June 16, 1884)—if this can be said to be making anything of it—when endeavouring to prepare the present address, I notice that Joule's and my own old experiments* on the thermal effect of gases expanding from a high-pressure vessel through a porous plug, proves the less dense gas to have greater intrinsic *potential* energy than the denser gas, if we assume the ordinary hypothesis regarding the temperature of a gas, according to which two gases are of equal temperatures† when the kinetic energies of their constituent molecules are of equal average amounts per molecule.

Think of the thing thus. Imagine a great multitude of particles enclosed by a boundary which may be pushed inwards in any part all round at pleasure. Now station an engineer corps of Maxwell's army of sorting demons all round the inclosure, with orders to push in the boundary diligently everywhere, when none of the besieged troops are near, and to do nothing when any of them are seen approaching, and until after they have turned again inwards. The result will be that, with exactly the same sum of kinetic and potential energies of the same inclosed multitude of particles, the throng has been caused to be denser. Now Joule's and my own old experiments on the efflux of air prove that if the crowd be common air, or oxygen, or nitrogen, or carbonic acid, the temperature is a little higher in the denser than in the rarer condition when the energies are the same. By the hypothesis, equality of temperature between two different gases or two portions of the same gas at different densities means equality of kinetic energies in the same number of molecules of the two. From our observations proving the temperature to be higher, it therefore follows that the potential energy is smaller in the condensed crowd. This—always, however, under protest as to the temperature hypothesis—proves some degree of attraction among the molecules, but it does not prove ultimate attraction between two molecules in collision, or at distances much less than the average mutual distance of nearest neighbours in the multitude. The collisional force might be replusive, as generally supposed hitherto, and yet attraction might predominate in the whole reckoning of difference between the intrinsic potential energies of the more dense and less dense multitudes. It is, however, remarkable that the explanation of the propagation of sound through gases, and even of the positive fluid pressure of a gas against the sides of the containing vessel, according to the kinetic theory of gases, is quite independent of the question whether the ultimate collisional force is attractive or repulsive. Of course it must be understood that, if it is attractive, the particles must be so small that they hardly ever meet—they would have to be infinitely small to *never* meet—that, in fact, they meet so seldom, in comparison with the number of times their courses are turned through large angles by attraction, that the influence of these purely attractive collisions is preponderant over that of the comparatively very rare impacts from actual contact. Thus, after all, the train of speculation suggested by Davy's 'Repuls ive Motion' does not allow us to escape from the idea of true repulsion, does not do more than let us say it is of no consequence, nor even say this with truth, because. if there are impacts at all, the nature of the force during the impact and the effects of the mutual impacts, however rare, cannot be evaded in any attempt to realize a conception of the kinetic theory of gases. And in fact, unless we are satisfied to imagine the atoms of a gas as mathematical points endowed with inertia, and, as according to Boscovich, endowed with forces of mutual positive and negative attraction, varying according to some definite function of the distance, we cannot avoid the question of impacts, and of vibrations and rotations of the molecules resulting from impacts, and we must look distinctly on each molecule as being either a little elastic solid or a configuration of motion in a continuous all-pervading liquid. I do not myself see how we can ever permanently rest anywhere short of this last view; but it would be a very pleasant temporary resting-place on the way to it if we could, as it were, make a mechanical model of a gas out of little pieces of round perfectly elastic solid matter, flying about through the space occupied by the gas, and colliding with one another and against the sides of the containing vessel. This is, in fact, all we have of the kinetic theory of gases up to the present time, and this has done for us, in the hands of Clausius and Maxwell, the great things which constitute our first step towards a molecular theory of matter. Of course from it we should have to go on to find an explanation of the elasticity and all the other properties of the molecules themselves, a subject vastly more complex and difficult than the gaseous properties, for the explanation of which we assume the elastic molecule; but without any explanation of the properties of the molecule itself, with merely the assumption that the molecule has the requisite properties, we might rest happy for a while in the

* Republished in Sir W. Thomson's 'Mathematical and Physical Papers,' vol. i., Article, xlix., p. 381.

† That this is a mere hypothesis has been scarcely remarked by the founders themselves, nor by almost any writer on the kinetic theory of gases. No one has yet examined the question: What is the condition as regards average distribution of kinetic energy, which is ultimately fulfilled by two portions of gaseous matter, separated by a thin elastic septum which absolutely prevents interdiffusion of matter, while it allows interchange of kinetic energy by collisions against itself? Indeed I do not know but that the present is the very first statement which has ever been published of this condition of the problem of equal temperatures between two gaseous masses.

contemplation of the kinetic theory of gases, and its explanation of the gaseous properties, which is not only stupendously important as a step towards a more thoroughgoing theory of matter, but is undoubtedly the expression of a perfectly intelligible and definite set of facts in Nature. But alas for our mechanical model consisting of the cloud of little elastic solids flying about amongst one another. Though each particle have absolutely perfect elasticity, the end must be pretty much the same as if it were but imperfectly elastic. The average effect of repeated and repeated mutual collisions must be to gradually convert all the translational energy into energy of shriller and shriller vibrations of the molecule. It seems certain that each collision must have something more of energy in vibrations of very finely divided nodal parts than there was of energy in such vibrations before the impact. The more minute this nodal subdivision, the less must be the tendency to give up part of the vibrational energy into the shape of translational energy in the course of a collision, and I think it is rigorously demonstrable that the whole translational energy must ultimately become transformed into vibrational energy of higher and higher nodal subdivisions if each molecule is a continuous elastic solid. Let us, then, leave the kinetic theory of gases for a time with this difficulty unsolved, in the hope that we or others after us may return to it, armed with more knowledge of the properties of matter, and with sharper mathematical weapons to cut through the barrier which at present hides from us any view of the molecule itself, and of the effects other than mere change of translational motion which it experiences in collision.

To explain the elasticity of a gas was the primary object of the kinetic theory of gases. This object is only attainable by the assumption of an elasticity more complex in character, and more difficult of explanation, than the elasticity of gases—the elasticity of a solid. Thus, even if the fatal fault in the theory, to which I have alluded, did not exist, and if we could be perfectly satisfied with the kinetic theory of gases founded on the collisions of elastic solid molecules, there would still be beyond it a grander theory which need not be considered a chimerical object of scientific ambition—to explain the elasticity of solids. But we may be stopped when we commence to look in the direction of such a theory with the cynical question: What do you mean by explaining a property of matter? As to being stopped by such question, all I can say is that if engineering were to be all and to end all physical science, we should perforce be content with merely finding properties of matter by observation, and using them for practical purposes. But I am sure very few, if any, engineers are practically satisfied with so narrow a view of their noble professsion. They must and do patiently observe, and discover by observation, properties of matter, and results of material combinations. But deeper questions are always present, and always fraught with interest to the true engineer, and he will be the last to give weight to any other objection to any attempt to see below the surface of things than the practical question: Is it likely to prove wholly futile? But now, instead of imagining the question: What do you mean by explaining a property of matter? to be put cynically, and letting ourselves be irritated by it, suppose we give to the questioner credit for being sympathetic, and condescend to try and answer his question. We find it not very easy to do so. All the properties of matter are so connected that we can scarcely imagine one *thoroughly explained* without our seeing its relation to all the others, without in fact having the explanation of all, and till we have this we cannot tell what we mean by "explaining a property," or "explaining the properties," of matter. But though this consummation may never be reached by man, the progress of science may be, I believe will be, step by step towards it, on many different roads converging towards it from all sides. The kinetic theory of gases is, as I have said, a true step on one of the roads. On the very distinct road of chemical science, St. Clair Deville arrived at his grand theory of dissociation without the slightest aid from the kinetic theory of gases. The fact that he worked it out solely from chemical observation and experiment, and expounded it to the world without any hypothesis whatever, and seemingly even without consciousness of the beautiful explanation it has in the kinetic theory of gases, secured for it immediately an independent solidity and importance as a chemical theory when he first promulgated it, to which it might even by this time scarcely have attained if it had first been suggested as a probability indicated by the kinetic theory of gases, and been only afterwards confirmed by observation. Now, however, guided by the views which Clausius and Williamson have given us of the continuous interchange of partners between the compound molecules constituting chemical compounds in the gaseous state, we see in Deville's theory of dissociation a point of contact of the most transcendent interest between the chemical and physical lines of scientific progress.

To return to elasticity: if we could make out of matter devoid of elasticity a combined system of relatively moving parts which, in virtue of motion, has the essential characteristics of an elastic body, this would surely be, if not positively a step in the kinetic theory of matter, at least a finger-post pointing a way which we may hope will lead to a kinetic theory of matter. Now this, as I have already shown,* we can do in several ways. In the case of the last of the communications referred to, of which only the title has hitherto been published, I showed that, from the mathematical investigation of a gyrostatically dominated combination contained in the passage of Thomson and Tait's 'Natural Philosophy' referred to, it follows that any ideal system of material particles, acting on one another mutually through massless connecting springs, may be perfectly imitated in a model consisting of rigid links jointed together, and having rapidly rotating fly-wheels pivoted on some or on all of the links. The imitation is not confined to cases of equilibrium. It holds also for vibration produced by disturbing the system infinitesimally from a position of stable equilibrium and leaving it to itself. Thus we may make a gyrostatic system such that it is in equilibrium under the influence of certain positive forces applied to different points of this system; all the forces being precisely the same as, and the points of application similarly situated to, those of the stable system with springs. Then, provided proper masses (that is to say, proper amounts and distributions of inertia) be attributed to the links, we may remove the external forces from each system, and the consequent vibration of the points of application of the forces will be identical. Or we may act upon the systems of material points and springs with any given forces for any given time, and leave it to itself, and do the same thing for the gyrostatic system; the consequent motion will be the same in the two cases. If in the one case the springs are made more and more stiff, and in the other case the angular velocities of the fly-wheels are made greater and greater, the periods of the vibrational constituents of the motion will become shorter and shorter, and the amplitudes smaller and smaller, and the motions will approach more and more nearly those of two perfectly rigid groups of material points, moving through space and rotating according to the well-known mode of rotation of a rigid body having unequal moments of inertia about its three principal axes. In one case the ideal nearly rigid connection

* Paper on "Vortex Atoms," 'Proc. R. S. E.,' February, 1867; abstract of a lecture before the Royal Institution of Great Britain, March 4, 1881, on "Elasticity Viewed as possibly a Mode of Motion"; Thomson and Tait's 'Natural Philosophy,' second edition, part 1, §§ 345, viii., to 345, xxvii.; "On Oscillation and Waves in an Adynamic Gyrostatic System" (title only), 'Proc. R. S. E.,' March, 1883.

between the particles is produced by massless exceedingly stiff springs; in the other case it is produced by the exceedingly rapid rotation of the fly-wheels in a system which, when the fly-wheels are deprived of their rotation, is perfectly limp.

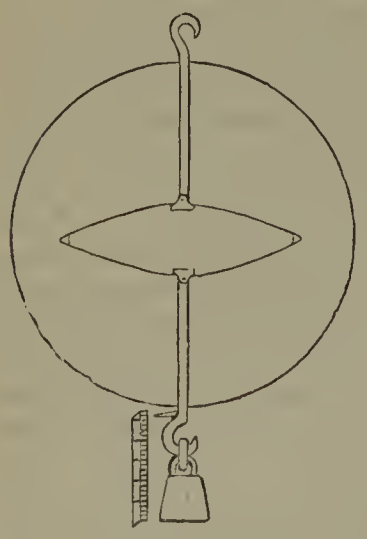

Fig. 1.

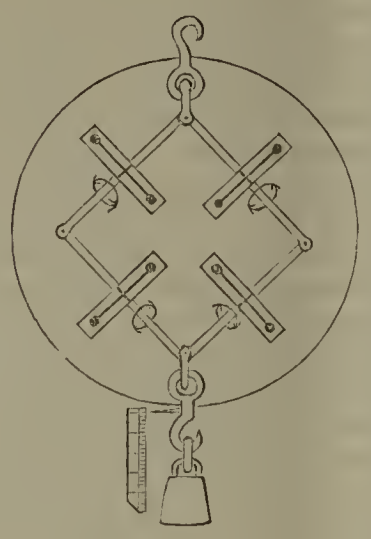

Fig. 2.

The drawings (Figs. 1 and 2) before you illustrate two such material systems.* The directions of rotation of the fly-wheels in the gyrostatic system (Fig. 2) are indicated by directional ellipses, which show in perspective the direction of rotation of the fly-wheel of each gyrostat. The gyrostatic system (Fig. 2) might have been constituted of two gyrostatic members, but four are shown for symmetry. The inclosing circle represents in each case in section an inclosing spherical shell to prevent the interior from being seen. In the inside of one there are fly-wheels, in the inside of the other a massless spring. The projecting hooked rods seem as if they are connected by a spring in each case. If we hang any one of the systems up by the hook on one of its projecting rods, and hang a weight to the hook of the other projecting rod, the weight, when first put on, will oscillate up and down, and will go on doing so for ever if the system be absolutely unfrictional. If we check the vibration by hand, the weight will hang down at rest, the pin drawn out to a certain degree; and the distance drawn out will be simply proportional to the weight hung on, as in an ordinary spring balance.

Here, then, out of matter possessing rigidity, but absolutely devoid of elasticity, we have made a perfect model of a spring in the form of a spring balance. Connect millions of millions of particles by pairs of rods such as these of this spring balance, and we have a group of particles constituting an elastic solid; exactly fulfilling the mathematical ideal worked out by Navier, Poisson, and Cauchy, and many other mathematicians who, following their example, have endeavoured to found a theory of the elasticity of solids on mutual attraction and repulsion between a group of material particles. All that can possibly be done by this theory, with its assumption of forces acting according to any assumed law of relation to distance, *is* done by the gyrostatic system. But the gyrostatic system does, besides, what the system of naturally acting material particles cannot do: it constitutes an elastic solid which can have the Faraday magneto-optic rotation of the plane of polarization of light; supposing the application of our solid to be a model of the luminiferous ether for illustrating the undulatory theory of light. The gyrostatic model spring balance is arranged to have zero moment of momentum as a whole, and therefore to contribute nothing to the Faraday rotation; with this arrangement the model illustrates the luminiferous ether in a field unaffected by magnetic force. But now let there be a different rotational velocity imparted to the jointed square round the axis of the two projecting hooked rods, such as to give a resultant moment of momentum round any given line through the centre of inertia of the system, and let pairs of the hooked rods in the model thus altered, which is no longer a model of a mere spring balance, be applied as connections between millions of pairs of particles as before; with the lines of resultant moment of momentum all similarly directed. We now have a model elastic solid which will have the property that the direction of vibration in waves of rectilinear vibrations propagated through it shall turn round the line of propagation of the waves, just as Faraday's observation proves to be done by the line of vibration of light in a dense medium between the poles of a powerful magnet. The case of wave front perpendicular to the lines of resultant moment of momentum (that is to say, the direction of propagation being parallel to these lines) corresponds, in our mechanical model, to the case of light travelling in the direction of the lines of force in a magnetic field.

In these illustrations and models we have different portions of ideal rigid matter acting upon one another, by normal pressure at mathematical points of contact—of course no forces of friction are supposed. It is exceedingly interesting to see how thus, with no other postulates than inertia, rigidity, and mutual impenetrability, we can thoroughly model not only an elastic solid, and any combination of elastic solids, but so complex and recondite a phenomenon as the passage of polarized light through a magnetic field. But now, with the view of ultimately discarding the postulate of rigidity from all our materials, let us suppose some to be absolutely destitute of rigidity, and to possess merely inertia and incompressibility, and mutual impenetrability with reference to the still remaining rigid matter. With these postulates we can produce a perfect model of mutual action at a distance between solid particles, fulfilling the condition, so keenly desired by Newton and Faraday, of being explained by continuous action through an intervening medium. The law of the mutual force in our model, however, is not the simple Newtonian law, but the much more complex law of the mutual action between electro-magnets—with this difference, that in the hydrokinetic model in every case the force is opposite in direction to the corresponding force in the electro-magnetic analogue.

Imagine a solid bored through with a hole and placed in our ideal perfect liquid. For a moment let the hole be stopped by a diaphragm, and let an impulsive pressure be applied for an instant uniformly over the whole membrane, and then instantly let the membrane be dissolved into liquid. This action originates a motion of the liquid relatively to the solid, of a kind to which I have given the name of "irrotational circulation," which remains absolutely constant however the solid be moved through the liquid. Thus, at any time the actual motion of the liquid at any point in the neighbourhood of the solid will be the resultant of the motion it would have in virtue of the circulation alone, were the solid at rest, and the motion it would have in virtue of the motion of the solid itself, had there been no circulation established through the aperture. It is interesting and important to remark in passing that the whole kinetic energy of the liquid is the sum of the kinetic energies which it would have in the two cases separately.

Now, imagine the whole liquid to be enclosed in an infi-

* In Fig. 1 the two hooked rods seen projecting from the sphere are connected by an elastic coach-spring. In Fig. 2 the hooked rods are connected one to each of two opposite corners of a four-sided jointed frame, each member of which carries a gyrostat so that the axis of rotation of the fly-wheel is in the axis of the member of the frame which bears it. Each of the hooked rods in Fig. 2 is connected to the framework through a swivel joint, so that the whole gyrostatic framework may be rotated about the axis of the hooked rods in order to annul the moment of momentum of the framework about this axis due to rotation of the fly-wheels in the gyrostat.

nitely large, rigid, containing vessel, and in the liquid, at an infinite distance from any part of the containing vessel, let two perforated solids, with irrotational circulation through each, be placed at rest near one another. The resultant fluid motion due to the two circulations will give rise to fluid pressure on the two bodies, which, if unbalanced, will cause them to move. The force systems—force-and-torques, or pairs of forces—required to prevent them from moving will be mutual and opposite, and will be the same as, but opposite in direction to, the mutual force systems required to hold at rest two electro-magnets fulfilling the following specification. The two electro-magnets are to be of the same shape and size as the two bodies, and to be placed in the same relative positions, and to consist of infinitely thin layers of electric currents in the surfaces of solids possessing extreme diamagnetic quality—in other words, infinitely small permeability. The distribution of electric current on each body may be any whatever which fulfils the condition that the total current across any closed line drawn on the surface once through the aperture is equal to $\frac{1}{4}\pi$ of the circulation* through the aperture in the hydro-kinetic analogue.

It might be imagined that the action at a distance thus provided for by fluid motion could serve as a foundation for a theory of the equilibrium, and the vibrations, of elastic solids, and the transmission of waves like those of light through an extended quasi-elastic solid medium. But unfortunately for this idea the equilibrium is essentially unstable, both in the case of magnets, and, notwithstanding the fact that the forces are oppositely directed, in the hydro-kinetic analogue also, when the several movable bodies (two or any greater number) are so placed relatively as to be in equilibrium. If, however, we connect the perforated bodies with circulation through them in the hydro-kinetic system, by jointed rigid connecting links, we may arrange for configurations of stable equilibrium. Thus without fly-wheels, but with fluid circulations through apertures, we may make a model spring balance, or a model luminiferous ether, either without or with the rotational quality corresponding to that of the true luminiferous ether in the magnetic fluid—in short, do all by the perforated solids with circulations through them that we saw we could do by means of linked gyrostats. But something that we cannot do by linked gyrostats we can do by the perforated bodies with fluid circulation: we can make a model gas. The mutual action at a distance, repulsive or attractive according to the mutual aspect of the two bodies when passing within collisional distance† of one another, suffices to produce the change of direction of motion in collision, which essentially constitutes the foundation of the kinetic theory of gases, and which, as we have seen before, may as well be due to attraction as to repulsion, so far as we know from any investigation hitherto made in this theory.

* The integral of tangential component velocity all round any closed curve, passing once through the aperture, is defined as the "cyclic constant," or the "circulation" ("Vortex Motion," § 60 (*a*), 'Trans. R. S. E.,' April 29, 1867). It has the same value for all closed curves passing just once through the aperture, and it remains constant through all time, whether the solid body be in motion or at rest.

† According to this view there is no precise distance, or definite condition respecting the distance, between two molecules, at which apparently they come to be in collision, or when receding from one another they cease to be in collision. It is convenient, however, in the kinetic theory of gases, to adopt arbitrarily a precise definition of collision, according to which two bodies or particles mutually acting at a distance may be said to be in collision when their mutual action exceeds some definite arbitrarily assigned limit, as, for example, when the radius of curvature of the path of either body is less than a stated fraction ($\frac{1}{100}$, for instance) of the distance between them.

There remains, however, as we have seen before, the difficulty of providing for the case of actual impacts between the solids, which must be done by giving them massless spring buffers, or, which amounts to the same thing, attributing to them repulsive forces sufficiently powerful at very short distances to absolutely prevent impacts between solid and solid; unless we adopt the equally repugnant idea of infinitely small perforated solids, with infinitely great fluid circulations through them. Were it not for this fundamental difficulty, the hydro-kinetic model gas would be exceedingly interesting; and, though we could scarcely adopt it as conceivably a true representation of what gases really are, it might still have some importance as a model configuration of solid and liquid matter, by which without elasticity the elasticity of a true gas might be represented.

But lastly, since the hydro-kinetic model gas with perforated solids and fluid circulations through them fails because of the impacts between the solids, let us annul the solids and leave the liquid performing irrotational circulation round vacancy,* in the place of the solid cores which we have hitherto supposed; or let us annul the rigidity of the solid cores of the rings and give them molecular rotation according to Helmholtz's theory of vortex motion. For stability the molecular rotation must be such as to give the same velocity at the boundary of the rotational fluid core as that of the irrotationally circulating liquid in contact with it, because, as I have proved, frictional slip between two portions of liquid in contact is inconsistent with stability. There is a further condition, upon which I cannot enter into detail just now, but which may be understood in a general way when I say that it is a condition of either uniform or of increasing molecular rotation from the surface inwards, analogous to the condition that the density of a liquid, resting for example under the influence of gravity, must either be uniform or must be greater below than above for stability of equilibrium. All that I have said in favour of the model vortex gas composed of perforated solids with fluid circulations through them holds without modification for the purely hydro-kinetic model, composed of either Helmholtz cored vortex-rings or of coreless vortices, and we are now troubled with no such difficulty as that of the impacts between solids. Whether, however, when the vortex theory of gases is thoroughly worked out, it will or will not be found to fail in a manner analogous to the failure which I have already pointed out in connection with the kinetic theory of gases composed of little elastic solid molecules, I cannot at present undertake to speak with certainty. It seems to me most probable that the vortex theory cannot fail in any such way, because all I have been able to find out hitherto regarding the vibration of vortices,† whether cored or coreless, does not seem to imply the liability of translational or impulsive energies of the individual vortices becoming lost in energy of smaller and smaller vibrations.

As a step towards kinetic theory of matter it is certainly most interesting to remark that in the quasi-elasticity, elasticity looking like that of an indiarubber band, which we see in a vibrating smoke-ring launched from an elliptic aperture, or in two smoke-rings which were circular, but which have become deformed from circularity by mutual collision, we have in reality a virtual elasticity in matter devoid of elasticity, and even devoid of rigidity, the virtual elasticity being due to motion, and generated by the generation of motion.

* Investigations respecting coreless vortices will be found in a paper by the author, "Vibrations of a Columnar Vortex," 'Proc. R. S. E.,' March 1, 1880; and a paper by Hicks, recently read before the Royal Society.

† See papers by the author "On Vortex Motion," 'Trans. R. S. E.,' April, 1867, and "Vortex Statics," 'Proc. R. S. E.,' December, 1875; also a paper by J. J. Thomson, B.A., "On the Vibrations of a Vortex Ring," 'Trans. R. S.,' December, 1881, and his valuable book on 'Vortex Motion.'

Proceedings of Scientific Societies.

CHEMISTS' ASSISTANTS' ASSOCIATION.

On Wednesday October 8th, 1884, a special general meeting was held at the new rooms, 103, Great Russell Street, W.C., for the purpose of considering the rules relating to honorary membership. Mr. Winfrey, President, occupied the chair.

In commencing the business, Mr. Winfrey explained the unsatisfactory footing upon which honorary members has hitherto been placed, and gave an account of the considerations of the council, in committee and otherwise, upon the subject.

Mr. Braithwaite proposed, and Mr. Flintan seconded, that the clause "and to enjoy all rights of membership, except that of voting at elections. The number of honorary members shall be limited to fifty," be added to rule 2. This was carried without dissension.

Mr. Braithwaite further proposed, and Mr. Cracknell seconded, that rule 6 in future read thus:—"The annual subscription shall be, for members, 5*s.*; for honorary members, 10*s.* 6*d.*, due in advance on the first of May." This was also carried unanimously, and the meeting adjourned.

INTERNATIONAL HEALTH EXHIBITION.

Vegetarianism.

The Vegetarian Society gave a dinner on Thursday, the 9th inst., in the restaurant carried on under their direction in the Health Exhibition, when the chair was taken by Dr. B. W. Richardson. The *menu* included soups—tomato and rice and lentil; *entrées*—green (sugar) corn, or young maize, oaten grits, and macaroni *au gratin*; removes—bruised haricots, savoury omelette, curried mushroons and rice, and bread fritters; *entremets*—boiled chestnuts, samp pudding, and vegetable marrow *au gratin*; vegetables—Brussels sprouts, potatoes, Jerusalem artichokes, and baked turnips; sweets—barley pudding, Ceylon pudding, apple and damson tart, vegetable custard, Iceland moss jelly, and pineapple; stewed fruits—pears, apricots, French plums. For dessert, in addition to several varieties of grapes, pears, apples, and nuts, there were served bananas, Spanish melons, green-gage-tomatoes, and Brazilian oranges. The beverages, besides lemonade, seltzer, and zoedone, were palatable unfermented concoctions, such as sparkling hop and morella, pear and other so-called fruit champagnes.

Dr. Richardson, describing himself as one for whom the flesh-pots had not entirely lost their savour, said he thought all present would admit that they had partaken of an agreeable, satisfying, and wholesome dinner. It seemed to him that there was in society a change of tone with regard to this question of food, and at least among those who, if not sick, were out of sorts and in want of rest and recreation, a growing dislike to animal food, and this was especially the case with ladies. Entering then upon the examination of some physiological questions, he expressed the belief that man might by care in the selection and preparation of certain kinds of vegetable food become a liver upon a vegetable diet. Man, he believed, was really a fruit-eating animal, but if this Society succeeded in attaining its objects it would be making certain advances towards those natural necessities which we saw in man himself. They must not hold altogether to the diet being wholly vegetable, and they must select those things from the vegetable world which were most suited to the digestive system of man, modifying them by art so as to assimilate them, as far as possible, to the condition of those animal products upon which we knew that men could subsist. The number of fruits available for the table might be increased; the cultivation of mushrooms might be most beneficially extended by utilizing that which was now refuse difficult to get rid of and a source of danger to health; other edible fungi, like the *Bovista* puff-ball, a delicious and nutritious article of food, might be introduced; and fern-roots, as fine flavoured when properly cooked as asparagus, might be brought to table. But vegetarians must go to chemistry as well as to cookery in order to do entirely without the transforming power of the animal in converting vegetable food to the use of man. Cheese, for instance, as the Chinese had known for ages, might be made without milk, from the lentil, and there was no doubt that we should discover a way to make milk, and that some day milk would be produced on as large a scale as beer was now in our breweries. After dealing with the question of the sufficiency of vegetable foods for the support of man in extremes of temperature, he glanced at the changes, physical and moral, which the adoption of a vegetable dietary would probably produce on civilized man, especially mentioning a diminution of the craving for alcoholic drinks.

One of the company, in answer to the objection that if we ceased to rear animals we should lose our supply of clothing, stated that his dress—cotton velveteen coat, dark linen drill waistcoat, corduroy trousers, black canvas shoes with gutta percha soles—was wholly of vegetable origin.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Solubility of Pills in the Stomach.

Sir,—In discussing the question of the solubility of pills in the stomach or intestinal canal, it appears to me the action of the stomach itself is apt to be overlooked. Food when swallowed does not simply lie quiescent in water at 100° F. for some time, but is exposed to a continual kneading action. We have not, it is true, the stomach of the cricket or of the cockroach, with the beautiful set of converging knives; nor have we the powerful gizzard of the fowl, with its triturating sand; but our stomach is yet a muscular one and able to contract strongly upon its contents, so much so that one would hardly imagine if a pill of wax could not endure the gentle pressure of the little finger of a young girl whilst it was being rolled about in warm water without undergoing disintegration, that it would come off intact after being exposed to the digestive action of the stomach. How much it may escape pressure and rolling in an otherwise empty stomach is another question; possibly, if not bulky enough to excite contraction of the stomach, it may be allowed to slip through the gate intact. I should imagine a solution of the question lies in the direction "Fiat experimentum in vili corpore." Pondo.

C. L. Phillips.—Emulsify the dose with thick and fresh mucilage and give it to the child in milk.

P. 31.—(1) We are unable to answer this question. (2) There has probably been some imperfection in the manipulation, as there is little doubt that the statement referred to is correct.

A. Graeme.—We know of nothing that would account for the difference in solubility which you say you have observed.

T. P. J.—We are not acquainted with the work on cattle mentioned.

A Student's Father.—You might have answered this question for yourself by consulting authorities accessible to everyone. For instance: "*Muscology.* That part of botany which treats of mosses."—*Treasury of Botany.* "That part of botany which investigates mosses; a discourse or treatise on mosses."—*Imperial Dictionary.*

J. Burt.—We do not think the statement has been made on European authority.

W. H. D.—The top line is "Acid Nitrate of Mercury."

Jumbo.—(1) We are not competent to advise you. (2) Try the effect of a minute quantity of carbolic acid.

Communications. Letters, etc., have been received from Messrs. Williams, Jones, Lindewald, Regor Segontianus.

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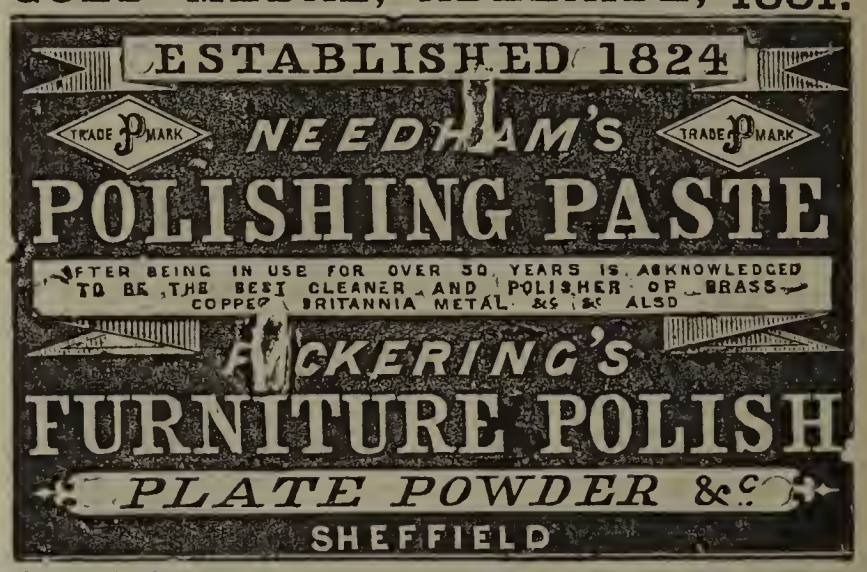

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TO APPRENTICE (in-door), a well educated youth to a Chemist and Druggist. Age 16. Passed Preliminary. JOHN CHAMBERS, Blankney Fen, Lincoln.

ENGAGEMENTS WANTED.

AS Dispenser, or with Chemist, for whole or part spare time, before 11 or after 3. Age 29. R. H., 50, White Lion St., Penton St., N.

AS Junior. Ætat. 21. Half time for study preferred. Beta, 20, Brancote Rd., Ilderton Rd., Bermondsey Estate, S.E.

AS Temporary Manager or Assistant. Many years' experience in London and country. First-class references. Disengaged. Chemist, Milton Villa, Shaftesbury Rd. East, Hammersmith, W.

AS Assistant. Age 22. Height 5ft 9in. 8 years' experience, seaside, Manchester and Liverpool. Can Prescribe and Extract Teeth. Disengaged October 26. Chemicus, 107, Prescot St., Liverpool.

AS Manager. With or without a view to purchase. A. E. Bertie Smith, 18, Laura Pl., Southampton.

AS Assistant or Manager. Well experienced in first-class businesses. Major qualification. Age 24. C. G. C., 24, Holland St., Kensington, W.

AS Dispenser, or Assistant in a good class business. Age 27. Height 5ft. 8in. Good references. H. W., 22, Welland Ter., Spalding.

AS Manager or Assistant, with a view to purchase, or partnership entertained. Married. A. Waterhouse, West Town, Dewsbury.

AS Assistant. Age 24. Height 5ft. 10in. Satisfactory references. Would prefer good town in Yorkshire. Chemicus, 9, Trafalgar Sq., Scarborough.

AS Temporary, in or out-door. Age 26. Minor qualification. First-class experience and good references. Please state particulars to Lulworth, Lordship Rd., Stoke Newington, London.

AS Assistant, in the country, where time could be had for study. Good references. Age 26. Disengaged 13th November. G. H., 68, Powis St., Woolwich, Kent.

AS competent Assistant, in high class Dispensing business. Thoroughly experienced. Good address. West-end preferred. Excellent references. Age 23. Height 6ft. Scotchman. O. J. B., 1, Russell Gardens, Kensington, W.

AS Assistant, with time for study, and if possible, assistance to pass Minor. 10 years' experience. Satisfactory references. Will accept salary in proportion to advantages offered. Necessary particulars to Edwards, Mr. Thomas, Chemist, Aberdare.

AS Junior. West-end preferred. Nearly 5 years' experience in first-class businesses. Age 20. O. Evans, Mr. Martindale, 10, New Cavendish St., London, W.

YOUNG Chemist (French) desires situation in London or country, in return for board and residence only. D. D., 205, Wardour St., W.

ADVERTISER, age 39, well experienced, wishes to meet with a gentleman with fair business, desirous of taking a less active part in the management. Advertiser can take charge if preferred. Highest references. Address, C. D., care of Messrs. Hodgkinson, Stead & Treacher, 198, Upper Whitecross St., E.C.

AS Assistant, in a Dispensing business. Age 25. Height 5ft. 8½in. Good Prescriber, Tooth Extractor, &c. Disengaged. A. G., 2, Sherwood St., W.

AS Senior or Manager. Town or country. Minor. Age 30. A good permanency or succession preferred. Chemicus, 33, Reedworth St., Kennington Pk., London.

AS Traveller, or Assistant in a Wholesale house with view to travelling, in which he has had some experience. Been 8 years in Retail. Highest references. Age 25. A., Montpellier, B. Salterton, Devon.

ENGAGEMENTS WANTED.

AS Assistant. Wholesale or Retail. 16 years' experience. For references and particulars, N. C. H., Laurel Villa, Foundry Hill, Hayle, Cornwall.

TOWN or country Traveller, or any position of trust.—A Chemist of some years' experience seeks an engagement with a good Wholesale house in the above capacity. Unlimited energy, and well known to the trade. On commission declined. For particulars, apply to Spatula, 65, Eccles Rd., Lavender Hill, S.W.

DISPENSER or Assistant, with Surgeon or Chemist, after 7 o'clock in the evening, for 4 or so evenings a week. Good references. M. C. S., 1, Alfred Pl., Bedford Sq., W.C.

AS Assistant. 7 years' experience, town and country. Can Dispense, Prescribe, and Extract Teeth. Abstainer. Excellent references. Age 22. C. E., 1, Merrick Sq., Trinity St., S.E.

WHOLESALE.—At Wet, Dry, Export, Checking, or Finishing off Counters. 7 years' Retail and 3½ Wholesale experience. Age 28. Disengaged. Good references. Zeta, 82, Mayall Rd., Brixton, S.W.

AS Junior, with half time to attend lectures. Age 22. T. P. S., 140, Hartfield Rd., New Wimbledon.

LOCUM Tenens. 5 years' Liverpool and 9 years' West-end experience. First-class testimonials. Disengaged. Chemicus, 150, Tottenham Court Rd., London, W.

AS Junior, in London. Age 20. Height 5½ft. 4 years' good experience. First-class references. Disengaged. F. W. Knowles, 223, Deptford Lower Rd., S.E.

ASSISTANTS WANTED.

VACANCY for a Dispensary Pupil at the Victoria Hospital, Queen's Rd., Chelsea. For particulars apply to the Dispenser.

AN Assistant, for a light Retail and Dispensing business. One only kept. State full particulars, saying when disengaged, to Badham & Sloman, 28, 29, 30, Higher Union St., Torquay.

SENIOR Compounder, at once. Must be a smart and accurate Dispenser, and accustomed to work neatly and briskly. To a competent man a good salary will be given. Apply, by letter, stating nature of experience, and salary required, in-door or out-door. Carte may also be sent to Fleiszig, care of F. Newbery & Sons, 1, King Edward St., Newgate St., London, E.C.

GILES, SCHACHT & CO., Clifton, require a competent Dispenser. In-doors. Should have excellent references, and be accustomed to high class trade. State experience and salary required.

IMMEDIATELY.—A good Junior Assistant. Must be a quick and accurate Dispenser. Steady, and possessing good references. Apply, stating age, salary required, and enclose photo., R. Sunner, Medical Hall, Cork.

AN Assistant of good appearance and address. Out-doors. Hours 8.30 till 8.0, excepting Market days. No Sunday duty. Please state usual particulars and enclose carte if convenient (to be returned). Apply, H. N. Grove, 11, Park St., Walsall.

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A JUNIOR Assistant, in-door, for a Mixed business. Apply, with full particulars, stating age, height, salary required and references, to R. Mumford, Chemist, Splotland, Cardiff.

ASSISTANTS WANTED.

A QUALIFIED Junior Assistant. Apply, with full particulars, to Glaisyer & Kemp, Brighton.

MANAGER, energetic, of good address and experience, 25 to 30, for a good business. Able to Prescribe well and Extract Teeth. References must bear strict investigation. Address, with references, experience, how long in last place, and salary required, in or out. Chemist, 165, Stanley Rd., Liverpool.

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IMMEDIATELY.—An Assistant, as Junior, not under 22, accustomed to first-class Dispensing business. Three kept. Apply, stating age, height, salary, and references, with carte, if convenient, to W. H. Pullin, Leamington.

IMMEDIATELY.—An Improver, for a good class Dispensing and Retail business. Apply, with full particulars, to William S. Bowler, Chemist, Belper.

IMMEDIATELY.—Manager, for good class country business. Able to Prescribe, Extract Teeth, &c. Must be well recommended. Apply, with full particulars of previous experience, salary required (unfurnished apartments found), and enclose carte, to A. Smart, High St., Steyning.

A GOOD Junior Assistant (in-door), for the country trade. One seeking a permanency preferred. State age, height, salary, and references, enclosing carte, if convenient, Wain & Illsley, Chemists, Ripley, Derby.

WHOLESALE.—A competent Assistant, with unexceptionable references. State age, experience, length of time in last situation and salary required, to Slinger & Son, York.

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AN Assistant, in-doors, for a Surgeon's Retail. Competent and of good address. Apply to O. C., 19, Eccleston St., Pimlico, S.W.

IMMEDIATELY.—A competent qualified Assistant (no Major man need apply), for branch at South Hampstead, N.W. Two kept. Must be a good Dispenser and Counterman. Not under 25. Apply, with full particulars, to J. H. Lewis, 22, Great Portland St., W.

IMMEDIATELY.—Competent Assistant, not under 23. Windle, 452, Edgware Rd., W.

IMPROVER or Junior, with part time for study. Good references required. W. P. Robinson, 12, Belle Vue Rd., Upper Tooting, S.W. 2 minutes' walk from Wandsworth Common Station.

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IMMEDIATELY.—A good Assistant, accustomed to first-class Retail and Dispensing. Apply, with full particulars, stating salary required, to Mr. Field, 56, Marine Parade, Brighton.

A COMPETENT gentlemanly Assistant for a Dispensing trade. Minor man preferred. Address, stating age, salary, and references, with photo., Mr. Hearder, Chemist, Plymouth.

ASSISTANTS WANTED.

IMMEDIATELY.—A Junior Assistant, accustomed to a good-class country trade. Short hours. An Apprentice kept. Apply, stating salary required, references, &c., J. Meredith, Chemist, Brecon.

IMMEDIATELY.—A Junior Assistant, accustomed to Agricultural trade. If able to Extract Teeth preferred. Carte de visite, if convenient (to be returned). Apply, stating age, height, experience, and salary required, to H. C. Webb, Pharmaceutical Chemist, Buckingham.

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"The Liquor Pepticus prepared by Mr. Benger is a digestive agent of extraordinary power."—Dr. WM. ROBERTS, F.R.S., at *Norwich Meeting of British Medical Association.*

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PHARMACEUTICAL CHEMISTS, MANCHESTER.

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TABLE OF CONTENTS.

Page

Chaulmoogra Seed. By Dr. Joseph Moeller 321
Brief Note on Oil of Limes. By Francis Watts 322
Relation of Plants to Hygiene. By J. M. Anders (*concluded*) 323
Vermilion: its Manufacture in China.. 325
The Collection of Brazilian Drugs at the Vienna Exhibition 327
Remarks on Tests for Albumen in the Urine, New and Old. By George Johnson, M.D., F.R.S. 329
Aloin. By Henry Charles Plenge 330

EDITORIAL ARTICLES AND NOTES :—

The Teaching of Natural Science.... 331
The Campaign against Secret Remedies in Germany 332

Page

Notes:—Opening of the Society s New Premises in Scotland — Spontaneous Heating of Fly Stone—Relative Success of Pharmaceutical Gatherings—A Vehicle Administration for Quinine—The Storage of Aerated Waters—Inventors and Exhibitions—The Cultivation of Pyrethrum Cinerariæfolium 332

TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY :—

Examinations in London 333

PROVINCIAL TRANSACTIONS :—

Liverpool Chemists' Association :—
The Relation of Chemistry to Health. By E. Davies 334

Page

Manchester Pharmacy Students' Association :—
Glimpses of Pharmacy in North America. By A. H. Jackson. 336
Oldham Chemists' Assistants and Apprentices' Association..... 338

PROCEEDINGS OF SCIENTIFIC SOCIETIES :—

Chemists' Assistants' Association.... 338

PARLIAMENTARY AND LAW PROCEEDINGS :—

Death under Methylene 340

Answers to Correspondents 340

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 5th, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at half-past 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 29th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

LIBRARY AND MUSEUM.

The Library is open daily from 9 a.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.) The Museum is open daily from 9 a.m. until 5 p.m., and from 7 p.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.)

Members, Associates, and Apprentices residing in the Provinces, may obtain books from the LIBRARY on application to the Librarian and payment of carriage one way.

SPECIAL NOTICE.

The following books are missing from the Library:—

Attfield's Chemistry, 9th ed., 1881.
Bentley's Manual of Botany, 4th ed., 1882.
Hardwich's Manual of Photographic Chemistry, 9th ed., 1883.
Martindale and Wescott's Extra Pharmacopœia, 3rd ed., 1884.

Members, Associates, and Apprentices are invited to examine their Libraries, and if any of the above-mentioned works be found therein, to forward such work or works to the Librarian of the Society.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 5th day of December next, at 12 o'clock precisely.

By order of the Council,

RICHARD BREMRIDGE,

Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 1st, 1884.

There are at present *thirty-nine* annuitants, receiving £1320 per annum, and casual relief is also granted, amounting to nearly £700 per annum, involving a total annual expenditure of upwards of £2000.

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Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

CATALOGUE OF THE MUSEUM.

The Catalogue of the Museum may be obtained from the Secretary, price 2s.; or by post, 2s. 4d. Each Member, Associate, and Apprentice of the Society will be supplied with one copy *gratis*, on application to the Secretary.

THE CHEMISTS' BALL.

A MEETING will be held, by permission, at 17, Bloomsbury Square, on Monday evening, November 3, 1884, at 9 p.m., for the purpose of making preliminary arrangements for the ensuing Ball. Any gentleman desirous of becoming a Steward, and unable to be present, will oblige by informing the Honorary Secretary without delay if such his intention.

Old Swan Lane, E.C. FRED. W. WARRICK, *Honorary Secretary.*

A DINNER OF SCOTTISH PHARMACISTS

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Opening of the Pharmaceutical Society's New House in Edinburgh

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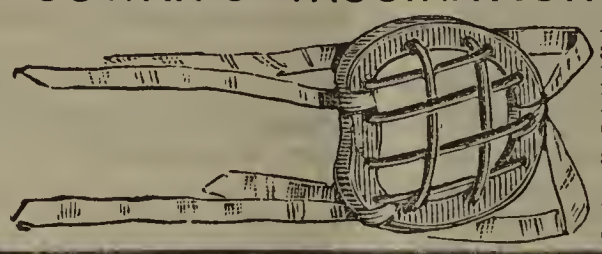

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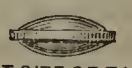

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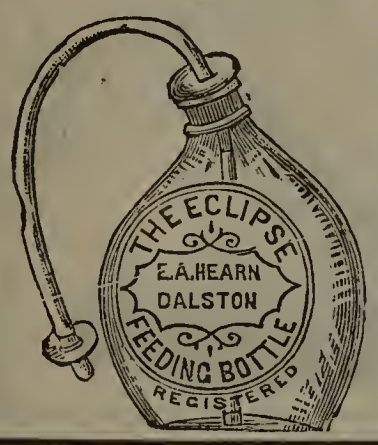

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Yours very truly, MARIE ROZE.

Your "Honey" is delicious. ELLEN TERRY.

The Lord Mayor of London orders it.

MANSION HOUSE, LONDON, E.C., *September* 28, 1883.

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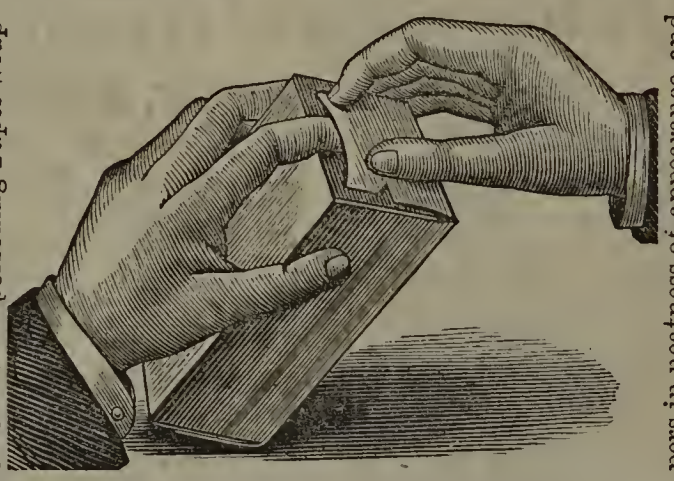

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"In our hands it has been a most effective agent in skin diseases, especially of the chronic eczematous class; and one case of psoriasis, which had resisted all other kinds of treatment, speedily got well under the application of the *Liquor Carbonis Detergens*. We esteem it a very valuable addition to our list of skin remedies."

From the *Medical Times and Gazette*, January 19, 1867.

"We have more than once called attention to the value of this remedy in chronic eczema."

British Medical Journal, April 1, 1882:—"*Wright's Liquor Carbonis Detergens*. This is by no means a new preparation, for it has been in extensive use for many years. It is an alcoholic solution of coal tar, and is disinfectant of considerable value. Medicinally, it is often used for the destruction of pediculi, and as an external application in eczema, psoriasis, and other skin diseases."

The Practitioner of September, 1881, reports a lecture entitled "Recent Advances in the Therapeutics of Diseases of the Skin," by W. A. JAMIESON, Esq., M.D., F.R.C.P. Ed. The following is an abstract therefrom:—"Itching, which owes its origin to too slow a current of blood, of which the most typical example is that seen in *Eczema* connected with varicose veins of the leg—but to the same category also many examples of Pruritus Scroti, Labiorum and Ani may be referred—is best relieved by careful flannel bandaging, well applied suspensory bandages, and laxative salts or mineral waters, which unload the rectal veins by freeing the portal circulation, combined locally with *weak tarry lotions*, one of the best of which is *Wright's Liquor Carbonis Detergens*, a well made *alcoholic solution of Coal Tar*, suitably diluted."

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Fig. 13.

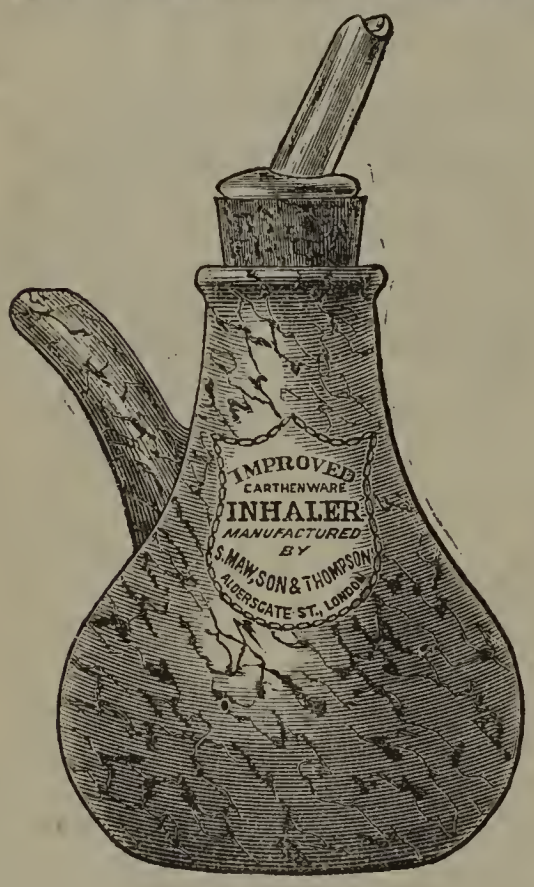

Fig. 8.

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Fig. 100.

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Fig. 8a.

MAW'S IMPROVED.

Fig. 8:—Marbled, 32s. per dozen.

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9 inches long, including Mouth-pieces ... ... 12s. per dozen.

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CHAULMOOGRA SEED.

BY DR. JOSEPH MOELLER,
Docent in the University of Vienna.

Through the kindness of Mr. Holmes I received for microscopical examination specimens of the chaulmoogra seed in the Museum of the Pharmaceutical Society of Great Britain. They comprised the following varieties:—

1. Seed of *Gynocardia odorata*, R. Br.
2. Seed of *Hydnocarpus anthelminthica*, Pierre (P. Smith).
3. Seed of *Hydnocarpus anthelminthica*, Pierre.
4. Seed of *Hydnocarpus inebrians*, Vahl.

Gynocardia and *Hydnocarpus* are genera of the order Bixaceæ.* Their fruits are large, spherical and contain numerous seeds embedded in a pulp. The seeds are either smooth or slightly furrowed longitudinally; their integument is thin and leathery or almost woody in texture. The embryo is orthotropic and surrounded by a dark-brown, fleshy, oily endosperm. The cotyledons are acute-ovate in shape, large, leafy, and three-nerved; the radicle is prominent.

1. *Gynocardia odorata.*

The seeds (fig. 1) are about 3 cm. long and measure about 1·5 cm. in their greatest breath. In shape they are elongated ovate and, having been

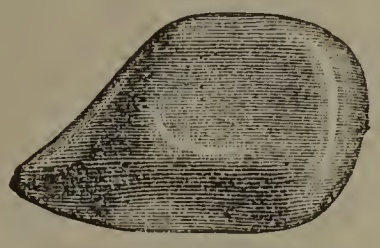

Fig. 1. Seed o *G. odorata*, nat. size.

flattened in places by the pressure of neighbouring seeds, are irregularly angular; the hilum is distinctly visible at the pointed end. The surface is dull in appearance, somewhat scurfy to the touch and yellowish-grey in colour. The weight averages 3 grams, of which 0·8 falls to the integument. The latter is not easily broken between the fingers as it lies tolerably close to the endosperm, which is but little shrunken; it is about as thick as a strong card (fig. 2), and consists of an outer and an inner

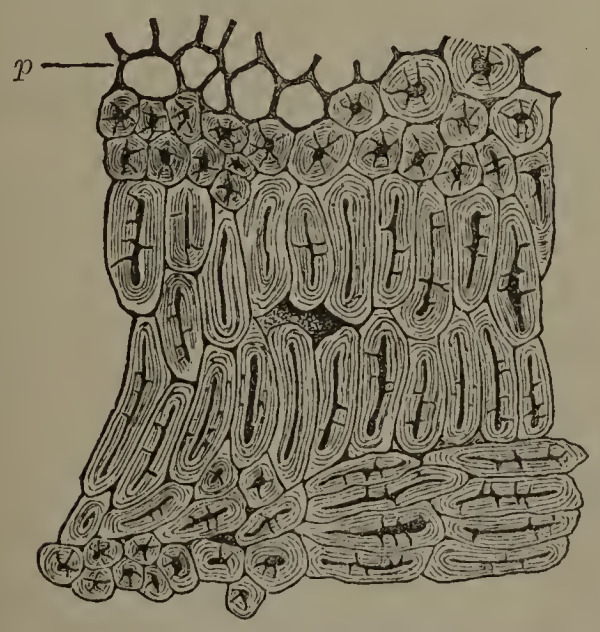

Fig. 2. Transverse section of integument (*G. odorata*); $\frac{30}{1}$); *p* = remains of pulp.

layer of stone cells placed parallel to the surface of the seed, the space between them being occupied by two or three rows of similar cells, the long axes of which are arranged nearly at right angles to those of the exterior cells. By this means the strength of the integument is much increased. A thin layer of pulp (*p*) still adheres to the exterior surface of the outer seed coat; it consists of loose parenchymatous tissue interspersed with isolated stone cells (fig. 3).*

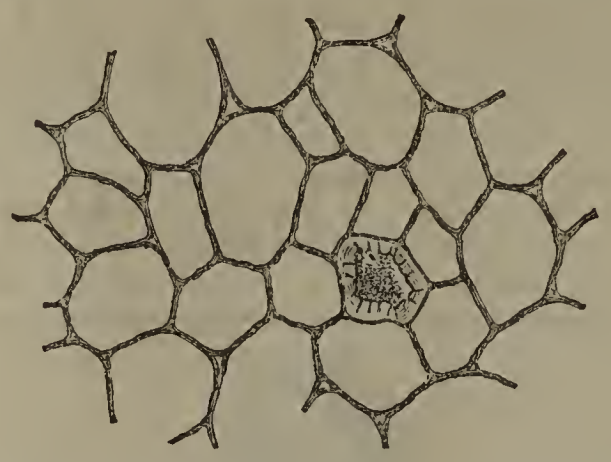

Fig. 3. Pulp (*G. odorata*), longitudinal section.

A transverse section does not exhibit the inner seed coat, but when a section is made parallel to the surface of the seed a delicate and partially broken layer of elongated parenchymatous cells will be seen covering the inner surface of the sclerenchymatous tissue (fig. 4).

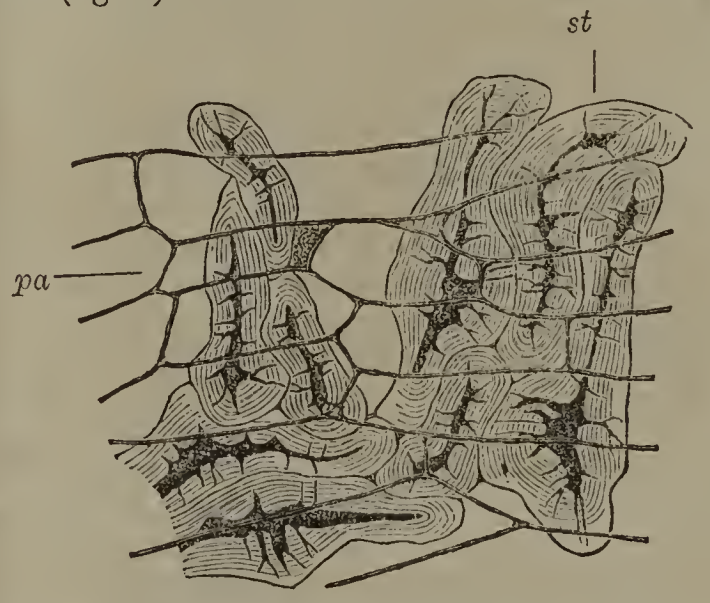

Fig. 4. Inner seed-coat (*G. odorata*); *st*, stone-cells; *pa*, underlying parenchyma.

The endosperm, which is covered by a delicate parenchymatous tissue, consisting of cells darkly coloured by phlobaphene, is built up of tolerably thick walled cells (fig. 5), completely filled with

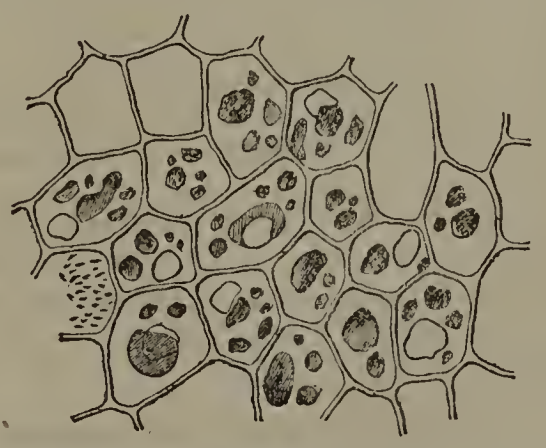

Fig. 5. Thick-walled cells of endosperm, after removal of fat, showing protein globules.

solid colourless fat and large yellow bodies of spherical or, less frequently, irregularly rounded shape. These bodies absorb colouring matters, are

* For description, see Bentley and Trimen, 'Medicinal Plants,' i., 28.

* This produces the slightly scurfy feel of the surface of the seed.

insoluble in alcohol and benzol, swell in concentrated acids and contract again when the acid is replaced by water. As they are themselves yellow, the colour reactions for albumen are not to be relied on. Starch and tannin are absent. The 'Pharmacographia' mentions groups of oxalate of calcium crystals as present, but I have not been able to find any.

2. *Hydnocarpus anthelminthica*, Pierre.

Mr. Holmes* has recently established the identity of this seed with the Dai-phong-tu and with the Lukrabo or Ta-fung-tsze, held in high esteem by the Chinese as a remedy for skin diseases. Dr. Porter Smith, in his 'Chinese Materia Medica,' regards them as a variety of Chaulmoogra, from which, however, they differ notably. The seeds are much smaller (fig. 6), rather longer than they are broad

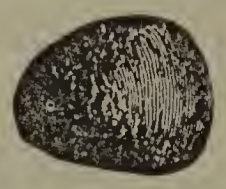

Fig. 6. Seed of *H. anthelminthica*, nat. size.

(18·14 mm.), resembling in shape a small bulb, of a brownish-black colour with a rough surface, and frequently with a large, distinct, rayed hilum. One seed weighs barely 2 grams, the albumen alone 0·6 gram. The integument is three times as thick (1·5 mm.) as that of *Gynocardia* and a sharply defined lighter coloured inner layer can easily be discerned with the naked eye. Microscopical examination shows this inner seed-coat to consist of a layer, 0·15 mm. thick, of stone-cells, all tangentially arranged and relatively but little thickened. The greater thickness and hardness of the integument is chiefly due to the larger number of the cells of the middle layer and the thickness of their walls. Like the corresponding cells in the testa of *Gynocardia* the cells of the middle layer of the testa of this seed are placed at right angles to the surface, whilst only those of the exterior layers are arranged tangentially. The cells of the pulp are smaller and more frequently interspersed with groups of stone-cells, which explains the greater roughness of the seeds as compared with *Gynocardia*. The cells of the endosperm also are smaller, but this part of the seed is distinguished from *Gynocardia* principally by the absence of the yellow bodies previously mentioned; on this account the albumen appears white. Alcohol and benzol leave undissolved numerous colourless, roundish bodies, varying in size from 0·004 mm. to 0·025 mm.; these bodies are coloured yellow by iodine and yield the xanthoprotein reaction; they are, therefore, to be regarded as albuminoid.

The similarity in the anatomical structure of these two seeds is so great, and the differences between them are so small, that there can be no doubt of the close relationship of Chaulmoogra and Lukrabo.

3. *Hydnocarpus anthelminthica*, Pierre.

The last described specimen, from Dr. Porter Smith, agrees fully with this one, which is taken from the herbarium of the Pharmaceutical Society; the albumen is, however, dark in colour, similar to that of *Gynocardia*, and, in fact, shows under the microscope the same yellow protein globules and fat as contents of the cells. Not the colour only, but the size also of these albuminous bodies varies (the yellow measuring not unfrequently 0·03 mm. and even more); both the seeds named *H. anthelminthica*, therefore, probably belong to the same species, and the identity of Lukrabo, Ta-fung-tsze and Dai-phong-tu may be considered established.

4. *Hydnocarpus inebrians*, Vahl.

Some of these seeds possess great similarity with those of *H. anthelminthica*, but are flatter, whilst others again are so different as to appear to belong to another species. They are considerably larger (attaining 3 cm. in length, 15 mm. in breadth, 10–12 mm. in thickness), and pointedly elliptical in shape. The hilum is warty and prominent, the surface longitudinally wrinkled (fig. 7).

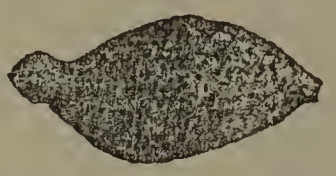

Fig. 7. Seed of *H. inebrians*, nat. size.

The smaller seeds weigh on the average 1 gram, of which the integument contributes about one-third; larger seeds weigh twice as much.

The integument shows a construction similar to that of the foregoing seeds, viz., an outer and an inner layer of cylindrical stone-cells tangentially disposed, enclosing a layer of similar cells arranged transversely. The latter consist in *H. inebrians* of one or, at most, two rows of cells, the integument being only 0·2 mm. thick. The raised points on the surface of the seed are also of sclerenchymatous origin, and are apparently intended to strengthen the thin testa. The pulp is similar to that of *H. anthelminthica*. The endosperm is covered with a layer of thin walled brownish-red cells, but is itself colourless and teems with fat and protein globules.

* *Pharm. Journ.* [3], xv., 41.

BRIEF NOTE ON OIL OF LIMES.

BY FRANCIS WATTS, F.C.S.

The recent notes on oil of limes in the Journal of the Pharmaceutical Society appeared to indicate that the distinguishing characters between hand made and distilled oil of limes were not very generally known. The following memoranda will perhaps prove of interest.

Ecuelled or hand made oil is of a decidedly yellow colour, varying in intensity, being darker in new specimens. The specific gravity also varies, being higher in newer samples; the mean specific gravity of seven samples, all under twelve months old, being ·8734. The following table gives a number of carefully determined specific gravities of various samples, all fairly new.

Temperature=29° C. (84° F.)		Water at 4° C.=1·0000.	
Age.	Sp. gr.	Age.	Sp.gr.
Under 24 hours .	·8755	About 6 to 7 months .	·8722
2 or 3 days . .	·8750	„ 5 „ 6 „ .	·8719
About 7 months .	·8737	„ 18 „ .	·8709
„ 6 „ .	·8732	—	·8704
„ 8 „ .	·8726	Distilled	·8554

Ecuelled oil may be regarded as an almost satu

rated solution of citropten, or lime camphor, and this may be made a means of distinction.

The difference in flavour and aroma is so marked as to scarcely require any other means of distinguishing ecuelled from distilled oil, the ecuelled having a decided and fragrant lemon-like smell, whilst the distilled is very inferior, frequently possessing little more than the smell of turpentine.

The distilled oil is usually almost colourless, is specifically lighter, of inferior aroma, and contains no citroptene.

When this citroptene is treated with oxidizing agents, *e.g.*, nitric acid or preferably chromic acid mixture, a red resinous acid body is produced (probably the limettic acid of Vohl).* So that if a sample of oil of limes be agitated with chromic acid mixture for some few minutes and the mixture filtered, the red resin will be left on the filter and sides of the test tube, if the oil be hand made ; but will not appear if simply distilled.

When agitated with Nessler's test ecuelled oils give pale yellow mixtures (apparently darker mixtures as the oil becomes older). Distilled oils, on the other hand, give dark grey and black mixtures, thus affording a marked distinction. Old resinized ecuelled oils, too, give dark greenish-grey mixtures.

By means of Nessler's test I believe it would thus be possible to detect admixtures of from 5–10 per cent. of distilled oil; but I have not yet had an opportunity of studying the reaction in the case of old but carefully preserved samples.

RELATION OF PLANTS TO HYGIENE.†

BY J. M. ANDERS, PH.D.

(*Concluded from page* 290.)

It became clear that more efficacious apparatus was necessary. Accordingly I had constructed a glass casing large enough to hold a dozen or more thrifty plants in pots. Such an arrangement, while it admitted the sunlight to the plants, likewise confined their exhalations to the air within the case. The ordinary tests for ozone (Schoenbein and guaiacum papers), applied to this atmosphere, gave very satisfactory results. When foliage plants alone were employed no reactions indicating the presence of ozone were obtained. On the other hand, when flowering specimens were experimented with, such as petunias, geraniums, fuchsias, begonias, hydrangeas, etc., really beautiful reactions occurred. No result was obtained on rainy days, though the plants were amply protected from the rain. This function is, according to these experiments, only excited under the influence of the sun's rays or good diffused light. The case was filled many times with different varieties of flowering species and invariably they gave evidence of causing the generation of this substance. The various substances known to answer to like tests were carefully precluded by applying other tests peculiar to themselves, so that there could scarcely be a source of error. From the data gained by these experiments the following conclusions were deduced: First, that flowering vegetation in general, during the day in fair weather, generates ozone. Secondly, that foliage plants do not possess this power. Thirdly, that the amount of ozone generated by flowering plants is sufficient to make them of decided sanitary value. I owe my thanks to Mr. G. B. M. Miller for much assistance in these experiments.

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* These bodies are at present under investigation.

† A lecture delivered before the Alumni Association of the Philadelphia College of Pharmacy. Reprinted from the 'Annual Report.'

Let me remind you in passing that vegetation is largely blooming, that numerous field plants, the forest trees, as well as fruit trees, put forth flowers, and that during this period they all add their quota of ozone to the surrounding medium. In order to fully appreciate the importance of this *ozonizing* action of flowering vegetation, it is necessary that I should call your attention for a moment to the sanitary value of ozone. It is generally acknowledged that ozone, through its oxidizing properties, purifies our atmosphere, ridding it of organic impurities, and even disease germs, which are the cause of various forms of suffering, and render the air too much polluted for breathing purposes. The fact that it is not detectable within our dwellings, nor even to the leeward of large cities, places where these decomposing organic substances are present in greater proportion, shows clearly that it is consumed in their oxidation.

Professor Max Von Pettenkofer makes the following statement in regard to the happy effect of ozone upon the atmosphere:—It is the constant purifier of the atmosphere from all organic matter which passes into it and might accumulate. The air would have been long ago filled with the vapours of decomposition if it were not for ozone, which oxidizes all that is oxidizable, if only time enough be allowed for it and not too much expected at once.

Having now shown the value of ozone as a hygienic agent it becomes evident that flowering plants acting as natural ozonizers must take a front rank as sanitary agencies. If the presence of ozone is of so great importance in the external atmosphere, must not its presence within doors be doubly important, since it is a fact, unhappily, too well known, that the air of our dwellings is charged with deleterious substances, due to such causes as human respiration, the escape of sewer gases, etc.? Again, the fact should not be lost sight of that we spend the greater portion of our lives indoors, and are, as a consequence, obliged to exist in and respire a more or less vitiated atmosphere during this time.

I have now hastily brought to your notice the effect upon the atmosphere of the two plant functions, the transpiration of aqueous vapours and the generation of ozone. Stronger evidences of their sanitary value, particularly in inclosed apartments, could scarcely be necessary to convince the most sceptical. It follows that plants should be welcomed into every household. For ordinary hygienic purposes the following proportion of plants may be taken as a good standard. Given a room twenty feet long, twelve feet wide and ceiling twelve feet high, warmed by dried air, from a dozen to eighteen thrifty plants with soft, thin leaves, and a leaf surface of six square feet each, would, if well watered, and so situated as to receive the direct rays of the sun (perferably the morning sun) for at least several hours, raise the proportion of aqueous vapour to about the health standard.

Your attention will now be directed to other spheres of usefulness plants have, growing out of the two functions already considered. Experience as well as reason teach us there are many ailments which are benefited by a moderately moist and warm air, but chiefly affections of the lungs and air passages. It is in the great majority of the diseases belonging to the latter class that dry artificial heat does such great mischief. Among the more common diseases affecting those organs may be mentioned acute and chronic catarrhal inflammation of the larynx and bronchi as a result of colds, all of which conditions are improved by a proper degree of humidity of the atmosphere in the living and sleeping rooms. The most distressing symptom in these cases is cough which is rendered less troublesome by the constant inhalation and atomization of a more or less moist atmosphere, such as is furnished by a sufficient number of plants. The remedial effect of such an atmosphere upon the diseased mucous membrane, as a means of reducing inflammatory action, is quite noticeable. The proportion of plants

necessary varies with the nature of the case and cannot here be indicated, but it may be stated that in a general way acute diseases require a greater profusion of plants than the more chronic forms, because the former require a more humid air in their treatment. The formula already given, it should be recollected, is intended to serve as a guide for sanitary purposes only, and not in conditions of actual disease.

Perhaps in no other condition of disease do plants and flowers offer such promise of becoming valuable therapeutic agents as in that dread and awe-inspiring disease, consumption of the lungs; and more especially do they seem to be effectual in preventing the development of the disease. Having made this assumption, it will be necessary to adduce evidence from practical experience in support of it, in order to entitle it to credence. In a previously published paper I gave a somewhat detailed account of a personal visit to thirty gardeners and florists of Philadelphia, the object being to ascertain the effect upon health of these pursuits. The result was to the effect that while in some cases they appeared to favour rheumatism, on the other hand they uniformly arrested the tendency to lung disease, in other words, prevented consumption. Since that time I have made inquiries of several others engaged in the same avocation and with the same results. The histories of some of these florists furnished evidence of the most convincing character. To give an instance, Mr. W., thirty-two years of age, had been following the pursuit of a gardener and florist from his boyhood days up to the time I saw him, some twenty years. He stated that he worked continuously among his plants, and during all these years enjoyed good health. There was a marked history of consumption in his family, he having lost a father and brother with the disease. As the histories of both the latter bear upon the question under consideration—both having been at one time florists—I will briefly outline them. The father followed the calling of florist from early life until sixty years of age, and during all that period, nearly half a century, enjoyed good health. When sixty he assisted at the erection of a church, and accidentally fell from a height, injuring his ribs, which disabled him for work. But a few months latter he went into consumption, which carried him off rapidly. The deceased brother had also been engaged as a florist from his boyhood until within a year of his death, which occurred at the age of thirty-six years. And during the time he followed his old avocation he had good health. About a year before his death he forsook his calling and took a store in the same city, and almost simultaneously he became a victim to consumption, which speedily caused his death.

Now does it not appear as though the facts, that the father was unable to work among his plants on account of the injury he had received, and the son having forsaken his life calling, may have had something to do with the development of the disease in these unfortunate subjects? Instances of this sort might be greatly multiplied both from my own recorded observations and the reported cases of other writers corroborating the same view, but time is wanting.* I am inclined, however, to make another extract from the excellent letter of Dr. Hiram Corson, to the *Norristown Herald*, already quoted from, bearing upon this point, aud which, so far as I know, has not been reprinted in any other journal or paper, but is none the less important. After detailing the case of a relative, who, at the age of sixty years, was in the incipient stage of consumption, and who was a great lover of plants and flowers, living among them continually until she reached the age of eighty-five, the prolongation of her life being ascribed to the beneficial influence of the exhalations from her numerous plants, he continues: "her cousin, a well-known botanist of Delaware County, whose only brother and sister died of consumption in middle age, lived among his plants to the age of seventy; and his brother, a well-known botanist of this county, who spent much time in his greenhouse, still lives at the age of ninety-four, while his daughter, who from early girlhood to the present hour, has been a botanist, and for more than forty years a practical cultivator of plants, in hot and greenhouses, is strong and healthy as she now approaches her seventieth year."

The above cases are perhaps conclusive evidence of the power plants possess to promote health and particularly in the case of those who manifest hereditary tendency to lung disease.

In order to obtain the best results it is necessary that both the living and sleeping rooms should be arranged for the purposes and well stocked with foliage and flowering plants, and the person or persons for whose benefit they may be employed should assume the care of the plants, which soon, to most persons, becomes a pleasing occupation, and affords the plants a better opportunity of accomplishing good results as it brings them—patient and plants—into closer contact. With regard to the question of the amount of plant life necessary to have the desired effect in these cases it would perhaps be impossible in the present state of our knowledge to lay down a limit, but since any number of plants would be harmless, it would be well to err, if at all, on the side of an excess. I should advise, at least, twice the number as laid down in the formula for ordinary hygienic purposes; in other words, let there be a profusion of flowering and foliage species, and let them be cultivated indoors and out. The rooms should be of good size and if possible the living room should have a southern exposure, the sun's rays being the chief excitors of transpiration and probably also of the function of the generation of ozone by plants. I have already stated that the beneficial influence exerted by house plants in preventing the symptoms of consumption from developing in those predisposed, has hitherto been ascribed to the effect upon the atmosphere of the function of transpiration and this was the only explanation that could with any show of reasoning be given until the present time. Now, however, since we know that flowering plants are also natural ozone generators, we must give some share of the credit to the salutory effect on the air of the ozone produced by the plants.

It may now be fairly assumed, according to the majority of authorities, that the bacillus tuberculosis discovered by Dr. Koch, of Berlin, is the cause of consumption. Grant that, as some authorities maintain, ozone has the power to destroy disease germs (and this would include the bacillus which causes this dread disease) and we have an easy explanation of the action of flowering plants in preventing the disease in question, for if the latter have the power to generate ozone they indirectly destroy the activity of the tubercular germs. It should be here stated that even though the air of a living room filled with flowering plants should show no ozone upon testing, this fact would not disprove its presence, for there are many sources of error in making experiments under such circumstances. In the first place ozone is rapidly consumed by the various impurities present, and secondly, as Dr. Nicholson has pointed out, the carbon dioxide in such an atmosphere, in consequence of human respiration, prevents the action of ozone upon the test papers.

The value of ozone in cases of consumption is too well known to need further comment here. The benefit to consumptive invalids from a residence among the balsamic vapours of the pine forests, is by some thought to be ascribable to the presence of ozone, which, according to Dr. Schreiber, of Vienna, is due to the action of the *terebinthinate* vapours upon the oxygen of the atmosphere, converting it into ozone. We have then to account for the favourable influence of plants in preventing this most fatal of all diseases by the combined action of flowering plants as natural ozonizers, and that

* See 'House Plants and Lung Disease': by the author. *Trans. Penna. State Med. Association*, 1883.

of plants as natural atomizers of moist, and, perhaps, even medicated vapours.

Assuming then that our premises are correct, are there not good reasons for making a more extended trial of a method of practice at once so available and withal so agreeable, being within reach of rich and poor alike? I do not wish to say dogmatically that failures might not occur, in some cases where phthisis is apprehended, particularly if the disease should already have made considerable ingress, as is sometimes the case before the patient or his friends are aware that much is wrong, but I do believe that the facts of the case warrant the statement that under proper regulations, house plants of the blooming and foliage varieties constitute a most valuable prophylactic measure against consumption and bronchial diseases.

It has already been intimated that plants are of great service in cases of confirmed consumption, and there is considerable evidence, the result of practical experience, to lend support to this idea. It is very much the fashion of the day to advise a change of climate in cases of phthisis, and it is the universal opinion of physicians that the change should be made as early as possible if a cure is to be effected. It is within the knowledge of nearly every one, that even when apparently judiciously advised, disappointment follows disappointment as the patient drags himself from one famous resort to another, until finally he finds himself unable to make long journeys, and being desirous of returning home, he makes another effort, death often overtaking him before he reaches those he loves.

It has been found that a convenient and efficient substitute for a winter or summer health resort can be secured by simply stocking the living and sleeping apartments of the patient with growing plants in winter, and living among and cultivating them out of doors in summer. A greenhouse would serve the purpose admirably, the most important requirements being a room of good size filled with plants, and the influence of the direct rays of the sun for several hours daily. In these cases it is particularly desirable that the care of the plants should be entrusted to the patient, if his strength will admit of it, as this insures a certain amount of physical exercise.

There are several important advantages possessed by our home health resort over the ordinary mountain and seaside resorts which are constantly being urged upon the attention of the public. I have already alluded to the fact that such a resort is both agreeable and convenient. It is, however, chiefly in its inexpensiveness that the strongest commendation lies, since the poorer classes of patients are for financial reasons unable to make the necessary sojourn at any of the reputed resorts. Again, by the present method we avoid the fatigue incident to long journeys as well as the separation of the patient from all the endearing relations of home.

I have thus hastily glanced at some of the most important and interesting practical phases of our subject, but to do it justice would demand several lectures of the length of this one. I trust, however, that enough has been brought forward to awaken an interest in the subject in, at least, some of my hearers, and that more practical cultivators of plants will be the result. Within the past few years I have been frequently gratified by statements from friends and strangers whom I chance to meet, to the effect that having learned of the beneficial influence exerted by house plants they had indulged their pleasure by commencing to cultivate them, and in no case have I learned that the silghtest inconvenience followed such a course. Encouraged by such favourable reports may I not be pardoned for hoping yet to see the day when the practice shall have become a thing universal? And the language of every household shall be:

> "The roses clustering o'er my portals
> Bid welcome to you fellow mortals."

VERMILION: ITS MANUFACTURE IN CHINA.*

The Chinaman has no knowledge whatever of chemistry, and of the principles of natural philosophy and statics generally his notions are of the most rudimentary and primitive description. How, then, in the face of these obvious disadvantages have the Chinese contrived to place themselves in the front rank amongst nations in the matter of certain chemical manufactures, one of the most important of which is the subject of this article,—Vermilion. He has succeeded in that instance not by any deep researches into the hidden mysteries of Nature, by no process of thought involving an inquiry into the "reason why;" to this the Chinaman is averse, the whole tendency of his education, such as it is, tends to make him satisfied with observing effects; it is sufficient to him to know that things are so, without going into troublesome or elaborate investigations of those changeless laws of Nature into which his philosophy teaches him that, as he cannot alter or control, research is fruitless; but that he has in his own small, ingenious, patient way observed effects to very good purpose the unrivalled excellence of some of his manufactures testifies. We will now enter a vermilion manufactory and watch the process from the first stage of mixing its two ingredients—mercury and sulphur—to the final process of weighing and packing this costly and beautiful pigment for the market.

The first objects to attract the visitor's attention on entering the yard attached to the works will probably be large piles or stacks of charcoal, crates or baskets of broken crockery ware, and numerous rusty old iron pans; there will also probably be a few broken and disused cast-iron mortars. All these articles are the cast off or worn out implements of the manufacture, and will be described in their proper order. On entering the factory proper, scores of little stone mills, each being turned by one man, and other long rows of workmen weighing out and wrapping up the vermilion will be seen. The furnaces are then arrived at; these may be a score or more in number and may be ten or twelve in each furnace room, five or six on each side. After passing these the stores of quicksilver, sulphur, alum, glue, new spare iron pans, serviceable crockery ware, and sieves and other utensils used in the factory are arrived at, and this completes the view of the works. The iron pans in which the vermilion is sublimed are those referred to above; they are circular and semi-spherical in shape; all are of the same size and weight; they are cast upside down, and in the casting, a runner or lump of iron, $2\frac{3}{8}$ inches in diameter by from $\frac{6}{8}$ to 1 inch in depth, is purposely left on every pan in order to enable the workman the more readily to handle the pan when stirring up its contents. The size of the pans proved by actual measurement to be $29\frac{1}{4}$ inches in diameter, by $8\frac{5}{8}$ inches deep, and the weight 40 catties, or say about 53 pounds. These pans are set in rows of five or six on each side of a small rectangular room, in size some 12 feet by 15 feet; the door of this room is of wood and contains an aperture a few inches square in order to enable the workman to watch the progress of his operation, from time to time, without the necessity of lowering the temperature of the apartment by opening the door. The pans are set in brickwork, each pan having beneath it a grate to hold the charcoal used as fuel. There is no communication between the grates or furnaces under each pan, and no chimney, the flames and products of combustion finding exit from the front of the grate which is left wholly open at all stages of the operation.

The process of manufacture is as follows:—Taking an iron pan, which is of 4 inches smaller diameter than those described, and also in all other respects proportionally less, except the runner, which is of the same size, a skilled workman proceeds to weigh out $17\frac{1}{3}$ lbs. of sulphur. This he places in the pan, and adds about half the contents of a bottle of quicksilver. The pan with its

* From *Zeitschrift für Analyt. Chemie.* Reprinted from the *Chemical News*, August 15, 1884.

contents is then put upon a small carthern brazier or portable furnace, the fuel used in which is charcoal. When the sulphur is sufficiently melted, the workman, taking an iron spatula or stirrer, rapidly stirs up the quicksilver with the sulphur, and gradually adds the remaining contents of the bottle of quicksilver, stirring the two ingredients together meanwhile until the mercury has wholly disappeared, or "been killed," as the Chinese put it. When this takes place the pan is removed from the fire, a small quantity of water is added, and rapidly stirred up with the contents of the pan, which have now assumed a dark blood-red appearance and semi-crystalline structure. This mass is then turned out of the pan into an iron mortar, and then broken up into a coarse powder. This forms a charge for one of the large pans previously described, and when sufficient material has been prepared to charge all the pans in one furnace chamber the sublimation is proceeded with as follows:—All the pans having received their quantum of crude vermilion, this is covered with a number of crockery- or porcelain-ware plates of tough, strong manufacture, each about 8 inches in diameter; some of these plates, however, are broken up, and are in a more or less fragmentary condition. When these plates have been piled up into a dome-shaped heap of the same shape as the bottom of the upper pan, to which they should extend, the whole is covered with one of the smaller pans previously described. Now, it will be remembered that the smaller pan was of 4 inches less diameter than the larger one; there will consequently be a circular space of 2 inches all round between the circumference of each pan. Consequently the rim of the upper or covering pan will be about 2 inches lower than the rim of the lower pan; there will also be some 4 inches space horizontally between the rim of the large lower pan and that portion of the smaller pan which is at the same height as the rim of the larger one. This space is carefully filled with a clay luting into which some holes, generally about four in number, are pierced, extending down to the rim of the smaller pan or cover; this is done in order to allow the heated air and other matters to escape. All the pans in one furnace chamber being thus charged and covered the fires are lighted. The flames from the charcoal should occasionally play several feet above the mouths of the furnaces. The door of the chamber is kept closed, except when it is open for a moment in order to enable the workmen to replenish the fires, which must be kept up at a fierce heat for eighteen hours. During this process a blue lambent flame is seen to play above each of the four holes which are pierced through the clay luting of the pans, so it is evident that a considerable quantity of either one or probably both the ingredients is wasted. After eighteen hours the fires are allowed to go out, and the contents of the pan cool down. When this is accomplished the greater portion of the vermilion will be found adhering to the lower surface of the broken-up porcelain plates with which the crude product is covered. The vermilion is then carefully removed from the porcelain by means of chisels, and is now ready for the elutriating mills. Another portion of vermilion of not so good quality is found adhering to the upper iron pan and that obtained by washing the clay luting in a cradle, as diggers wash dirt for gold. This together with the wipings and scrapings generally is mixed up with alum and glue-water into cakes, and, after drying on a brick surface heated beneath by means of wood or charcoal, is powdered up on a mortar, and re-sublimed when a sufficient quantity has accumulated.

The vermilion which was removed from the porcelain plates is of a blood-red colour and crystalline structure. This is then powdered up in a mortar and removed to the levigating mills; these are the ordinary little horizontal stone mills used by Chinese and other natives of the east to grind rice and other grain into flour or pulp, as the case may be. Each stone is about 2½ feet in diameter; the ower stone is stationary, the upper is turned by a direct-acting piece of wood having a hole in it which works a wooden peg affixed to the upper stone, which is made to revolve by a backward and forward movement of the piece of wood, or handle, some 3 or 4 feet long, previously mentioned. One man turns each mill. The upper stone has a small hole in it near its centre, down which the workman from time to time pours a little spoonful of the powdered vermilion, which he washes down into the mill with water: as he turns the mill the workman keeps continually ladling little spoonfuls of water down the aperture or hole in the upper stone; the ground and thus elutriated vermilion, as it escapes from between the stones, is washed down by the water into a vessel placed beneath to receive it. When work is suspended for the evening the ground vermilion is carefully stirred up with a solution of glue and alum in water, in the proportion of about an ounce of each to the gallon. The glue has been made to mix with the water by previously heating it with a small quantity of water; the earthen pots in which this process is effected each hold about 6 gallons. The mixture is then left to settle. In the following morning the mixture of glue and alum is poured off the vermilion, and the upper portion of the cake of vermilion at the bottom of the vessel—that is, the portion which remained longest suspended in the liquid—will be found to be in a much finer state of subdivision than the lower portion, which requires to be again elutriated as on the previous day: this separation of the more finely divided vermilion from that which was coarser, by suspension in a dense medium, is a really most ingenious process, for which we should give the Chinaman every credit. The process of grinding, elutriation, and separation of the coarsely ground from the fine vermilion, sometimes requires to be several times repeated, in order to fully bring out the colour. As a final process the damp cake of finely ground vermilion is stirred up with clean water, and allowed to settle down until the next morning, when the water is carefully poured off into large wooden vats to still further deposit a small quantity of vermilion still remaining in suspension, and the vermilion dried in the open air on the roof of the premises. When quite dried the cakes of now full-coloured pigment are carefully powdered and sifted by means of square muslin-bottomed sieves, contained in a covered box some 2 feet high by 2½ wide, in which the sieves, which slide on a framework inside the box, are jerked backwards and forwards by means of a handle on the outside of the box or case containing them.

The now fully prepared vermilion is removed to the packing house, where may be seen rows of workmen, men and boys, seated before a series of tables. Between every two workmen is a third, with a small pair of scales, which he holds in his left hand; and as the workmen on either side place before him the little pieces of paper in which the vermilion is to be wrapped up, he weighs into each paper 1 tael (about an ounce and a third avoidupois) weight of vermilion: the papers are two in number, the inner a black or prepared paper, and the outer a piece of ordinary white paper. After being wrapped up the packets are placed in rows before another workman, who stamps them with a seal containing in Chinese characters the name and address of the manufactory in which the article has been made, and the quantity and quality of vermilion contained in the packet.

The rapidity and deftness of the Chinese workmen at this employment is really surprising, the stamping, for instance, is effected at the average rate of sixty impressions per minute, and the wrapping up is carried on with proportionate rapidity. The mixture of alum, which is the ordinary aluminium potassium sulphate, with the vermilion, in one of its stages of manufacture as described above, is not added, as at first sight we thought it might be, merely to assist in clarifying or purifying the water by causing it to deposit its sediment, but seems to have some peculiar effect upon the colour. Although what may be the *rationale* of the process, or how it acts, we cannot quite clearly see; the glue is added as described above

merely to favour separation of the finely elutriated vermilion by holding it longer in suspension than the coarser particles, which sink first, and may therefore be separated in their order of stratification. The actual composition of vermilion is 100 parts of mercury to 16 of sulphur, when both these ingredients are in a perfectly pure state; the excess of five and one-third pounds of sulphur added by the Chinese is probably volatilized and lost in the process of sublimation, or as the sulphur used is generally not quite pure, a part may go for foreign matter contained in the sulphur; the balance being probably the *raison d'être* of the blue lambent flame seen playing over the apertures in the luting during the sublimation process. For a people having, like the Chinese, no acquaintance with even the first rudiments of chemistry, the proportion of ingredients taken—56¼ catties to 13 catties, or say 75 pounds to 17⅓ pounds—shows wonderfully accurate powers of observation and a knowledge of combining proportions only to be gained by much experience and a long extended series of careful observations highly creditable to the manufacturers. The entire process is one of the most ingenious and interesting to be seen in any part of the world.

THE COLLECTION OF BRAZILIAN DRUGS AT THE VIENNA EXHIBITION.

Although this collection of drugs was mentioned by name in the report upon the International Pharmaceutical Exhibition at Vienna, which appeared in this Journal last year, a description of the individual plants could not then be given.

The *Zeitschrift des Allgemeinen östereichische Apotheker-Vereines* now enables us to make up for this deficiency by quoting a series of notes upon the uses, etc., of these drugs. Very little is known about some of them in this country, and as South American drugs are frequently sent over to England, some of the information which has been furnished to the above may at a future time be found useful for reference. These notes are furnished to the above journal by Gustave Peckolt, apothecary at Rio Janeiro, son of the well-known botanist, Dr. Theodor Peckolt.

Carquega Amargosa.—The leaves of *Baccharis genistelloides*, Pers. (*Compositæ*).—The powerfully bitter leaves serve as a substitute for wormwood. A tea prepared from these leaves is much used for indigestion and diarrhœa, 12 grams of the leaves being infused in 600 grams of water and taken in doses of a wineglassful. An aqueous extract is used in conjunction with salts of iron for debility and anæmia; a spirituous extract in doses of 2 grams for liver disease, and the bitter resin every two hours in intermittent fever between the attacks.

The fresh leaves analysed by Dr. Theodor Peckolt were found to contain in 1000 parts 1·347 per cent. of a volatile oil and 17·948 of a dark green soft resin soluble in ether, 11·218 of a dark green hard acid resin insoluble in ether, 3·236 of a brown bitter resin, 8·413 of a tannin giving a green precipitate with iron salts; also wax, fat, etc.

The fresh leaves afforded 10 per cent. of watery extract and 9 per cent. of a spirituous one.

The leaves are said to be exported in considerable quantity to France for preparing a secret remedy or some other purpose. The idea seems to suggest itself that this may be used as an ingredient of absinthe.

Jaborandi.—Mr. Peckolt remarks that various leaves of other rutaceous plants, more especially of the genus *Xanthoxylum*, are exported under this name by ignorant collectors (see *Pharm. Journ.*, October 20, 1883, p. 476, and *Pharm. Centralhalle*, No. 37, 1875).

Jurumbeba (*Solanum insidiosum*, Mart).—The leaves and unripe fruit are much used at Rio in vesical catarrh and liver disease. The drug is taken in the form of wine or pills and a plaster made with the extract is also applied externally. The dose of the leaves is 2 grams in 500 grams of infusion, a wineglassful being taken four times a day; of the extract 0·051 gram in the form of a pill four times daily.

Mangueira.—The flowers of the mango, *Mangifera indica*, L. (*Anacardiaceæ*), are used either in the form of tea or powder for catarrh of the bladder. The powder is also used in the form of fumigation against mosquitoes.

Rosa de Caboclo.—The freshly expressed juice of the Indian rose plant, *Langsdorffia hypogæa*, Mart. (*Balanophoraceæ*), is used as an aphrodisiac, and the flower buds are eaten by the Indians.

On analysis 1000 grams of the fresh roots of the plant yielded 9·015 grams of a soft bitter resin, and 7·768 grams of a yellow resinous acid soluble in ether, 3·137 per cent. of a brown resin insoluble in ether, 4·018 per cent. of a crystallized vegetable acid, 32·100 grams of a wax giving off a vanilla odour when heated, as does also the extract of the root. The vegetable acid does not correspond in chemical reactions with any known acid and seems to deserve further investigation.

Cipó de Chumbo (*Cuscuta racemosa*, Mart.).—The expressed juice of the fresh plant is used in menorrhagia and catarrhal affections. The decoction is taken internally and used externally for *crusta lactea* and as a gargle for inflammation of the throat. The powdered herb is said to be useful as a vulnerary.

Castanha de Cera (*Pachira*, Sp).—The leaves possess mucilaginous properties. The seeds contain 25·385 per cent. of a colourless fat melting at 77° F. and are edible. The tree affords a strong bast.

Crua or Melao do baboclo (*Sicana odorifera*, Naud., *Cucurbitaceæ*). — In the ripe state it (the fruit) has a very pleasant odour. The juice is used as a refrigerant and antefebrile remedy, and the seeds are regarded as a powerful emmenagogue.

Fava contra (*Canavalia gladiata*, DC. *Leguminosæ*).—The seeds are used as a remedy against the bites of serpents. The seeds are pounded with rum, the liquid pressed out and drunk, and the expressed portion applied to the bitten part.

Fructo de Abutua (*Abuta rufescens*, Aubl).—The root is a considerable article of export as Pareira brava; it would be interesting to know for what purpose it is used, as it is impossible that the thousands of kilos exported should be used for medicinal purposes.

Fructo de Arradiabo (*Cnidoscalus neglectus*, Pohl. *Euphorbiaceæ*).—In Pernambuco the freshly bruised leaves are used as a poultice for carbuncle. The leaves and husk of the fruit are furnished with glandular hairs which sting most virulently, causing blisters where they touch the skin and giving rise to fever. The seeds contain 31·5 per cent. of a pugative oil.

Fructus de Barbatimao (*Stryphnodendron polyphyllum*, Mart. *Leguminosæ*).—The pods contain soft sweet pulp, with a styptic after-taste, and are used for hemoptyses. The fresh pods were found by Dr. T. Peckolt to contain 7·9 per cent., and the dried pods 17·584 per cent. of tannin, which gives a black precipitate with ferric salts.

Fructos de almecega (*Protium heptaphyllum β brasiliense*, Engl. *Burseraceæ*).

Fructos de Buchuiha (*Luffa operculata*, Cogn. *Cucurbitaceæ*).—The fruits are as drastic in their action as colocynth, and are used in dropsy, amenorrhœa, liver complaints, and tropical anæmia (opilacao). For dropsy, a fruit is boiled for some time, strained and beaten until cold, into a froth like white of egg, and a tablespoonful given every half-hour until vomiting or purging take place. In the northern provinces of Brazil it is used indiscriminately by the common people in all diseases, and, consequently, is sometimes used with bad results. For general use a bottle is half filled with the sliced fibrous part of the fruit, the bottle filled with rum and allowed to stand a day in the sun. In any indisposition a small dram glassful is taken, which usually produces six to eight evacuations.

Fructos de Copaiba (*Copaifera nitida*, Mart.).—The pods are used only by herbalists in the treatment of gonorrhœa, but with success. It is noteworthy that the pods contain 19·568 per cent. of a soft resin, having the odour of balsam of copaiba, and that the odour of copaiba is found only in the wood, bark, and pods of the tree, the black seeds containing 3·558 per cent. of a fat oil, having the odour of tonka bean, and the orange-yellow arillus surrounding the seed being free from odour.

Fructo de Cujeté (*Crescentia Cujete*, L.).—The pulp of the unripe fruit is beaten with sugar and taken in teaspoonful doses as a remedy for catarrh and bilious fever, and the expressed juice in doses of 8–15 grams in the treatment of convulsions. In the province of Pernambuco the full grown unripe fruit is heated over a fire until the shell begins to crack, and the pulp then removed, or squeezed out while hot, and given in doses of two spoonfuls for traumatic tetanus. The herbalists mix the heated mass with tapioca meal and make it into pills, or rather boluses, which they give for elephantiasis. Externally, it is applied to ruptures, and as a poultice for headache, bruises, scalds, and to ripen boils. The seeds are also used by the common people as a tænifuge. The not pleasant pulp of the ripe fruit is eaten by negroes and Indians without unpleasant results. With the juice of the ripe fruit a cough linctus is prepared. The pulp, on examination, was found to contain malic, tartaric and crescentinic acids, a tannin giving a green colour with salts of iron, a bitter substance, brown resin, etc.; a kilogram of the fresh unripe fruit afforded 292·700 grams of juice, which yielded 1·690 gram of crescentinic acid crystallized in four-sided prisms from the alcoholic solution. The seeds contain an acrid, bitter, fat oil.

Jaca (*Thevetia neriifolia*, Juss. *Apocynaceæ*).—One kernel eaten, or pounded with milk and drunk, acts as a purgative in about a quarter of an hour; sometimes also producing vomiting. The usual dose as a purgative is half a seed, in rheumatism and dropsy. It is also a popular remedy for snake bites. Two seeds are beaten with a beerglassful of rum and strained, and a tumblerful taken every half-hour or hour and the residue applied to the wound. It is now, however, becoming supplanted by the subcutaneous injection of permanganate of potash. Notwithstanding that the activity of this antidote is doubted in Europe Mr. Peckolt says that in Brazil there is almost daily proof of its distinct efficacy.

Fructo de Papagaio (*Mahonia* sp.?)—In the province of Minas, this fruit is called "Moribo," and in San Paulo "Moluro." It is a popular remedy for gonorrhœa. Parrots are very fond of the fruit.

Fructo de Peroba (*Aspidosperma peroba*, Tr. Allen. *Apocynaceæ*).—The seeds are used as a purgative.

Laranjas de Mato (*Gardenia suavcolens*, Vell. *Cinchonaceæ*).—The bitter root-bark is used as a tonic in intermittent fever. The fruit is roasted in ashes and eaten by the Indians.

Baunilha do Rio (*Vanilla palmarum*, Lindl. *Orchidaceæ*).—The pods are collected in the province of Rio de Janeiro, in abundance on the banks of the river Parahyba, and would by proper treatment afford a good article of export. They contain 1·03 per cent. of vanillin.

Casca de Angrio Vermelho (*Piptadenia gida*, Benth. *Mimoseæ*).—Much used as an alterative and blood purifier, being given in decoction made in the proportions of 60 grams to 500 grams of water, and strained. Externally it is used in the form of decoction or fluid extract as an application for œdema of the feet and chronic ulcers. The wood of the tree is valued as timber and the sawdust is used for preparing a fluid extract of syrupy consistence which is used as a vulnerary. It was used by Dr. Peckolt in a hospital at Rio de Janeiro for wounds, and in three days the pus had nearly disappeared, and in twenty days the wounds were perfectly healed. The sawdust was found to contain 5·128 per cent. of a soft resin soluble in ether, and 20·512 per cent. of tannin. A tincture of the leaves is also used for bruises and cuts.

Casca de barbatimao (*Stryphnodendron polyphyllum*, Mart. *Mimoseæ*).—The bark is frequently exported to Europe as *Cortex adstringens*. According to Dr. Peixoto the decoction of the fresh bark, or the powder in the form of a poultice, is useful for unhealthy sores, and as an injection for leucorrhœa or passive hæmorrhage. It is used in the form of snuff for epistaxis, and the extract in the form of plaster for rupture. In cases of *post-partum* hæmorrhage a decoction is made of 20 grams of the bark to 240 of water, the decoction strained, and 4 grams of acetic ether added; of this mixtnre a tablespoonful is given every hour. Dr. T. Peckolt found in the fresh bark 0·792, and in the fresh leaves 0·528 per cent. of a tannin which gives a green precipitate with salts of iron.

Casca de Cedro Vermelho, *Cedrela vellosiana*, Rœm.—According to some writers on Brazilian drugs the bark possesses emetic properties, a statement that has also been copied in some French works. According to Dr. T. Peckolt's investigations in the hospital of Rio Janeiro the statement is not supported by facts. He gave the decoction in the dose of 40 grams of the bark to 240 grams of water without the least symptom of nausea being produced, and in one patient suffering from dysentery, in whose case an emetic was indicated, the decoction cured the patient. The fluid extract is given with success in diarrhœa, a tablespoonful being given every three hours of a mixture of 8 grams of the fluid extract in 120 of water. The fresh bark was found to yield only 0·03 per cent of tannin, which gives a black precipitate with iron salts. Ten kilograms of the dried bark yielded 1·976 grams of a volatile oil, having the odour of the wood.

Casca de Raiz de Cipo Suma (*Anchietea salutaris*, St. Hil. *Violaceæ*).—The root bark is officinal, and is much prized as a remedy for syphilis and herpetic eruptions. It is also used for whooping-cough in the form of syrup, 4 grams of tincture mixed with 30 of simple syrup. The decoction is prepared of the strength of 30 parts of the root to 500 of water; the powder is taken in doses of 2 to 6 grams three times a day.*

Casca de Guaranhem (*Lucuma glycyphlœum*, Eichl. *Sapotaceæ*).—Dr. Peckolt found in monesia bark 22 per mille of monesia—tannic acid—which gives a black coloration with iron salts, 6·960 of gallic acid, 2·800 of monesin, an acrid amorphous body, 0·090 of lucumin, a body crystallizing in silky needles, 1·130 of a bitter substance and 15·000 of glycyrrhizin, tartaric and citric acids, wax, etc.

The dose of the decoction is made from 30 grams of the bark boiled in 500 grams of water. Of the extract (known as monesia), the dose is 0·6 to 1·5 gram, taken during the day. The tincture is prepared from 1 part of the bark and 5 of spirit of wine.

Casca de Mulungu (*Erythrina Mulungu*, Benth. *Leguminosæ*).—A largely used and much valued remedy. In small doses it acts as an anodyne and sedative; in larger doses it produces sleep without causing excitement; it is also used in cases of hypertrophy. It is added to baths to relieve rheumatism.

This drug has no doubt an important future, and it is well worthy of further examination from a physiological and a therapeutic point of view. The active principle has not yet been obtained in a definite form, although a yellow odourless resin and a strongly narcotic extract of a disagreeable bitter taste, tannin and nitrate of potash have been prepared from the bark.

Casca Paratudo (*Hortia arborea*, Engl. *Rutaceæ*).—The bark is an excellent tonic; it has an agreeable aromatic odour, a mild bitter flavour with a burning aftertaste, due to the presence of volatile oil. It is a favourite tonic for weak digestion. The infusion is used in zymotic fevers, especially when severe (*atuctische*) skin eruptions are present.

* See *Archiv der Ph.*, 1852, Bd. 97, p. 271.

The dose of the powdered bark is 0·5 to 1 gram. A concentrated infusion is used as an enema in prolapsus ani.

Casca de Pao Pereira (*Geissospermum Vellosii*, Fr. Allen).—The active principle, geissospermine, is best prepared by making an alcoholic extract, distilling off the alcohol and treating the residue with acidulated water and precipitating with ammonia. When prepared directly from a watery extract of the bark, the alkaloid is purified with difficulty.

Casca de Sangue de Drago (*Croton erythæma*, Mart. *Euphorbiaceæ*).—The bark is a favourite astringent. A decoction of the fresh bark evaporated to an extract of a weak syrupy consistence is known as mellado de sangue de drago. In chronic diarrhœa of adults the dose is a teaspoonful three times a day; for children a teaspoonful of a mixture of 2 grams of the extract with 60 grams of water every three hours. It is employed in the form of injection for gonorrhœa and leucorrhœa. It has also been used as a vulnerary with success.*

Casca de raiz Timbo (*Lonchocarpus Peckoltii*, Waura *Leguminosæ*).—A very powerful narcotic drug, which deserves to be introduced into Europe.

Casca de Tinguaciba (*Xanthoxylum tinguassiba*, St. Hil. *Rutaceæ*).—The decoction is used as a powerful sudorific, and in the form of a gargle for affections of the throat, also as an addition to odontalgic tincture. Dr. Peckolt has found in the bark an alkaloid producing effects similar to those of pilocarpine.

Quina do Remijio (*Remijia ferruginea*, Ol. *Cinchonaceæ*).—The root-bark has long been used as a remedy for intermittent fever by the wandering natives. The active principle is an acid resin having a shining crystalline appearance and named by Dr. Peckolt vieirine after Dr. J. A. Vieira de Mattos, who discovered it in 1860. The vieirine can be prepared by exhausting the powdered bark with water rendered alkaline with ammonium or sodium hydrate and precipitating the liquid with acetic or hydrochloric acid. If extracted by means of milk of lime and alcohol it is obtained in a shining crystalline form resembling santonin. It is soluble in alcohol and alkalies and is given in a mixture with wine and bicarbonate of sodium.

Raiz de azedinha grama (*Oxalis violacea*, Vell.)—Root used as a diuretic; it is sweet and edible.

Raiz de Calumba de Brasil.—This is used as a tonic in weak digestion and for diarrhœa. *Simaruba salubris*, Engl.

Raiz de Jaborandi do Rio (*Artanthe Mollicoma*, Miq.)—Root used as a diuretic and in liver complaints. See Peckolt in *Pharm. Centralh.*, 1878, No. 37.

REMARKS ON TESTS FOR ALBUMEN IN THE URINE, NEW AND OLD.†

BY GEORGE JOHNSON, M.D., F.R.S.,

Professor of Clinical Medicine, Senior Physician to King's College Hospital.

In a paper on the above subject in the recently published *Manchester Medical Chronicle*, Dr. William Roberts, referring to the fact that the urine in health contains various forms of albuminoid matter, expresses his belief that the new tests for albumen which have recently been brought into prominence, especially picric acid, tungstate of soda, potassio-mercuric iodide, and the acidulated brine-test, "produce frequently in the urines of perfectly healthy persons a reaction which is undistinguishable from the reaction which indicates disease or abnormality." This point was put to the proof by the examination of the urine of thirty-one healthy persons—students, candidates for insurance, and others, who exhibited no signs of disordered health, and in whose urine heat and nitric acid gave no indication of albumen.

Dr. Roberts, of course, needs not to be reminded that albumen, in greater or less abundance, and for long periods of time, may be unquestionably present in the urine of persons who exhibit no signs of disordered health. If this were not so, albuminuria would not be so frequently unsuspected and overlooked as it is.

Dr. Roberts proceeds to state that "the acidulated brine-test gave a reaction in eleven cases, picric acid in fourteen, the tungstate test in twenty-eight, and the mercuric iodide in twenty-nine cases."

Deferring for the present what I have to say of picric acid, I should have expected, from observations which I have quite recently made, that the other three tests would give a slight but appreciable reaction in every specimen of normal urine. It is a fact that all normal urine contains a small but variable proportion of mucus.

Now, mucin is precipitated by dilute acetic acid and mineral acids. (See the article "Mucus," in Watts's 'Dictionary of Chemistry,' vol. iii., p. 1059-60.) It is also precipitated, as Dr. Oliver has shown ('Bedside Urinary Testing,' p. 37), by citric acid. The addition of a small quantity of acetic or citric acid to normal urine gradually renders it slightly but decidedly turbid, by coagulating the mucin; and Dr. Roberts mentions the fact that, when nitric acid is added to albuminous urine, "the albumen is thrown down just above the line of junction of the two liquids, while the mucin is brought into view toward the upper part of the column of urine, where it gradually forms a diffused haze, quite distinct from the opalescent haze at the line of junction."

To this I may add that, when nitric acid is placed at the bottom of a column of normal urine, a diffused haze of coagulated mucin may commonly, after a time, be seen near the upper part of the column.

Seeing then that mucin is precipitated by both mineral and vegetable acids, we are at no loss to understand that any test containing one or other of these agents should give a reaction with normal urine. The acidulated brine contains hydrochloric acid, the tungstate of soda and potassio-mercuric iodide require the addition of either citric or acetic acid before they act as albumen-precipitants; and they one and all, by the reaction with mucin, slowly cause, in most, if not all, normal urines, a cloudiness more decided than that which results from the action of the acids alone. With picric acid, however, the case is entirely different. In the form of a saturated aqueous solution, and uncombined with any other agent, it is a most delicate albumen-precipitant, but it gives no precipitate in normal urine unless an acid, such as citric or acetic acid, be added to it. This can readily be proved by the following experiment. Take about a drachm of freshly passed normal urine, and add an equal bulk of picric acid solution. The yellow mixture will remain quite clear, unless, as sometimes though rarely happens, some turbidity results from a deposit of urates, which would be at once removed by heat. Now add a few drops of dilute acetic or citric acid, and the mixture will, in a minute or two, become hazy from precipitated mucin, the haziness occurring much more slowly than the immediate opalescence, which results from the presence of a slight trace of albumen, but, like that, being unchanged by heat.

Another experiment consists in adding acetic or citric acid to normal urine, then, after waiting a minute or two to complete the coagulation of the mucin, passing the urine through a filter and adding picric acid to the filtrate; when the mixture will remain quite free from turbidity. I have tested many hundred specimens of normal urine with picric acid, and I confidently assert that in such specimens, no precipitate or haziness occurs when unmixed picric acid is used as the test-agent; and it may be that the different results with this test obtained by Dr. Roberts are due to his having added acetic or citric acid to the picric acid in his experiments. The only precipitates other than albuminous which may result from picric acid, employed alone, are urates

* See also *Archiv der Pharm.*, 1862, Bd. 108, p. 142.

† From the *British Medical Journal*, October 11.

which rarely occur, except when the mixture is allowed to stand for some time; peptones, which I have met with only twice in as many years; and vegetable alkaloids, such as quinine, when large doses are being taken. These all differ from an albuminous precipitate in the fact that they are readily and completely redissolved by heat, while they may be distinguished from each other by the microscope. (See the author's lectures on 'Albumen and Sugar Testing,' p. 11, Smith, Elder and Co.)

It appears, therefore, from very numerous and careful observations, that albumen is the only substance found in the urine which gives with picric acid a precipitate insoluble by heat.

The difference, then, between picric acid and the other new tests for albumen is this—that picric acid, unmixed with other reagents, while it is a most sensitive and trustworthy test for allbumen, gives no reaction with mucin. On the other hand, the potassio mercuric iodide, tungsgate of soda, and brine, do not precipitate albumen, unless when combined with an acid; and this combination gives a reaction with mucin, which is not distinguishable from a minute trace of albumen.

I have been in the habit of using the potassio-mercuric iodide only as a check upon the picric acid test, when small quantities of albumen only were present, and, until lately, had not thought of applying it to normal urine. I now find, however. that this test-liquid, when acidulated —as it must be, to act at all—gives a distinct opalescence in most, if not all, normal urines. I find, too, that after the mucin has been removed from normal urine by its coagulation with acetic or citric acid, and subsequent filtration, the addition of the potassio-mercuric iodide to the filtrate causes a decided opalescence, which is probably due to the precipitation of some substance other than mucin in the urine.

In testing urines which contain a mere trace of albumen, it is important to remove any turbidity that would interfere with the process. Urates would be removed by heat, suspended mucus and other particles by filtration. The addition of the picric acid solution to a turbid specimen might give a fallacious appearance of coagulated albumen, when, in fact, there is nothing more than some increased opacity, due to the yellow staining of the suspended particles.

Picric acid is itself sufficiently acid, when added in excess, to dissolve and clear a phosphatic turbidity. In the rare case of the urine being so highly alkaline as to prevent the coagulation of the albumen by an excess of picric acid, the plan is to add sufficient citric or acetic acid to neutralize the alkali, then to filter, and add the picric acid to the filtrate.

It appears, then, that picric acid as a test for albumen is more free from fallacy than any other, not even excepting heat and nitric acid, which Dr. Roberts expresses his determination to fall back upon. Of course, in a doubtful case, no one would neglect to apply more than one test. That picric acid is a more sensitive test than heat and nitric acid is easily proved by taking a highly albuminous specimen and gradually diluting it up to the point where—though these tests fail to detect it—picric acid still gives a distinct reaction.

The main advantages of picric acid as a test for albumen are the following:—It instantly detects a small amount of albumen which nitric acid would indicate only slowly or not at all; while, on the one hand, an insufficient addition of the test does not, as is the case with nitric acid, prevent the subsequent coagulation by heat; neither, on the other hand, does an excess of picric acid redissolve the precipitate, as does an exccss of nitric acid. For bedside urinary testing, the portability of the innocuous powder is a great convenience. The fact that, with caustic potash, it is an infallible qualitative and quantitative test for sugar, may be said to more than double its value as an urinary test. For bedside use, Mr. Hawksley, 357, Oxford Street, makes a waistcoat-pocket test-case, consisting of a test-tube four inches long, in which are packed two smaller tubes, one containing picric acid powder, the other grain-lumps of caustic potash, and also a small spirit lamp. These are enclosed in a metal case, not much larger than a pencil-case.

Another small case contains a nipple-pipette, which, amongst other uses, is convenient for conveying urine from the vessel to the test-tube.

The picric acid which is used for sugar-testing should be purified by recrystallization. The commercial samples usually give a red colour when boiled with liquor potassæ; and I lately saw an impure sample which not only gave this red colour, but the liquid was rendered turbid by fine granules. The impurity was removed by solution and recrystallization. A simple test of the purity of picric acid for chemical purposes is to boil a mixture of one volume of the saturated solution with half its volume of liquor potassæ. The resulting liquid should be quite pellucid, and of a pale lemon-yellow colour, with no red tinge.

ALOIN.*

BY HENRY CHARLES PLENGE, PH.G.

The only published process which *à priori* seemed practicable for all varieties of aloes is that of Tilden, which was followed: — Twenty-five grams of aloes were dissolved in 250 c.c. of boiling water acidulated with hydrochloric acid and allowed to cool. The liquid was then decanted from the precipitated resinous matter, evaporated to about 50 c.c., and set aside two weeks for crystals to form. The liquid portion was poured off, the crystals were pressed between folds of bibulous paper to remove as much as possible of the adhering resin, and then purification by various means was tried.

The mixture of crystals and resin was dissolved in diluted alcohol, the solution filtered and set aside to crystallize. The crystals were still contaminated with a considerable amount of resinous matter. Other solvents were used, of which acetic ether proved to be the best. The resin is apparently more soluble in ether than the aloin, and when the impure aloin was treated with this solvent and allowed to stand, with occasional agitation, the liquid acquired a brown colour, and the yellowish colour of the crystals could be distinguished. The liquid was then quickly and carefully poured off and the crystals dried.

Five commercial varieties of aloes were experimented with: socotrine, Barbadoes, Cape, Curaçoa and Bonare. The two latter were very similar in appearance and yielded about the same amount of aloin. From Cape aloes no aloin was obtained.

In the first experiment socotrine yielded 3 per cent. of aloin; in subsequent trials none was obtained. Barbadoes aloes, to which this process is specially adapted, averaged 9 per cent.; Curaçoa averged 7·5 per cent., and Bonare 7 per cent. The cause of variation in the yield of aloin from different portions of the same sample treated by the same process is evidently due to variation in the degree of heat used in evaporating the infusion and probably also to the length of time at which the heat was applied. By the use of a vacuum apparatus the yield would undoubtedly have been greater and the aloin of a better quality. The aloin finally obtained was not in distinct crystals but in crystalline crusts.

Aloin was obtained from socotrine aloes by the following process :---One part of socotrine aloes was digested in 3 parts of alcohol for twenty-four hours, then transferred to a water-bath and boiled for about two hours. After cooling, the liquid was poured off from the resin, filtered, placed in an open dish, loosely covered and set aside to crystallize. The crystals were then washed with a little alcohol and dried. The yield was about 10 per cent.

* From the *American Journal of Pharmacy*, October, 1884.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 25, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the ransmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelop s indorsed "Pharm. Journ."*

THE TEACHING OF NATURAL SCIENCE.

IN the educational unrest which has marked the last twenty years of the social history of this country one most satisfactory feature has been the growing importance that has become attached to the acquirement during a school career of a knowledge of the elements of natural science. The fact has been slowly, but surely, dawning upon the mind of the community that even from the most utilitarian stand-point merely an elementary acquaintance with the principles of natural science brings with it to anyone advantages and pleasures comparable at least to the opening up of new fields of literature by linguistic acquirements. But especially to those pupils to whose lot it may fall in after life to follow certain callings the possession of this kind of information may prove of priceless value, whilst ignorance may mean defeat in the struggle for existence with better equipped competitors. Still it is very doubtful whether the increased and more widely spread desire for instruction in the principles of natural science has yet resulted in an adequate and suitable adaptation of the methods of teaching to the desired end. It is true that natural science has now more or less grudgingly been allowed to take a place in the curricula of colleges and schools where classics and mathematics long reigned supreme, that the country is dotted through its length and breadth with "science classes" receiving the aid of the State through the medium of an abundantly officered public department and that text-books of science are as plentiful as blackberries. If the energy of all this machinery were always wisely and disinterestedly applied there would be good reason for hoping that the craving for scientific knowledge which has been set up during recent years in the public appetite was being satisfied by healthy food, and there would be some prospect of Great Britain soon making up some of the ground that she has undoubtedly lost in this direction as compared with her continental neighbours. But there is little risk of being wrong in saying that the gross good results that might accrue in such case are at present sadly diminished before they reach the public by not a few tolls levied by inefficiency and selfishness. The question, therefore, how far either or both of these impoverishing factors might be eliminated is one of considerable interest, and Dr. ARMSTRONG did useful service in discussing it in a paper on the teaching of natural science as a part of the ordinary school course and on the method of teaching chemistry in the introductory course in sciences classes, schools and colleges, which he brought before a recent conference at the Health Exhibition and which has now been issued as a separate pamphlet.

Dr. ARMSTRONG expresses strongly his opinion that the most important of all the causes which operate against the diffusion of science in the present day is the imperfection of the method of teaching it. This is hardly in accord with what was told the students in a recent "introductory" address, but Dr. ARMSTRONG is not without arguments to support his opinion. The great objection that he has to the method at present in vogue is that it is practically the same whether science is taught as a part of a general school course or whether it is taught professionally; a lad being put to study chemistry, for example, at school in just the same way as at a science college, the only difference being that he does not carry his studies so far at one as at the other. Indeed Dr. ARMSTRONG would have no single branch of natural science selected to be taught as part of an ordinary school course, but he would have the course comprise the elements of what he calls the "science of daily life." This he defines as including astronomy, botany, chemistry, geology, mechanics, physics, physiology and zoology — the "physiography" of HUXLEY or the *Naturkunde* of the Germans—in so far as is essential to the understanding of the ordinary operations and objects of nature. The order in which the subjects constituting this *olla podrida*, as Dr. ARMSTRONG himself terms it, should be taken is left open for discussion; but, personally, he would "prefer to begin with botany, "and introduce as soon as possible the various "branches of science in no particular order but that "best suited to the understanding of the various "objects or phenomena to which the teaching for "the time being had reference." There is sufficient vagueness, if not inconsistency, in the language in which these views are propounded to leave the reader somewhat uncertain as to what is really the nature of the teaching that Dr. ARMSTRONG desires; but a little light is thrown upon this point by a subsequent remark that female educators appear already to have grasped the importance of such teaching, and that under the guise of "domestic economy" much of what is advocated is already being taught in girls' schools. So far as we can understand the proposition we are inclined to think that in dealing with such a multifarious schedule of sciences the teaching would become very superficial and desultory, and would necessarily tend towards the explanation of phenomena in no particular order rather than to the inculcation of princi-

ples which would give a clue to them all. At any rate we quite agree with Dr. ARMSTRONG that there are few teachers or books capable of giving such instruction, and we very much doubt whether, even with the earnest co-operation of any number of specialists, a scheme could be elaborated on these lines that would satisfy the requirement that education should be a mental training as well as an imbibition of "useful" information.

We think Dr. ARMSTRONG is more successful, though quite as revolutionary, when he proceeds to deal with the manner in which particular branches of science should be taught, and illustrates it by the one with which he is most familiar, namely, chemistry. Taking for instance the classes conducted under the auspices of the Science and Art Department, he points out that, from an inspection of the syllabus of the elementary stage and of the examinations, it appears that all students alike are required to have an elementary knowledge of the methods of preparing and of the properties of the commoner non-metallic elements, and that in this respect no distinction is drawn between the *dilletante* student and the one who is intending to follow chemistry as a life calling. With respect to the former class, at least, most persons will agree with him that there is no reason why in the beginning attention should be confined so completely to the non-metals, especially when certain of the metals enter so largely into common use. Still more questionable is the custom of emphasizing the presumed distinction between inorganic and organic chemistry to such an extent that the latter is almost always relegated to a period of advanced study, and even the fringe of it does not come within the grasp of the ordinary student who aspires to anything like a "physiographical" source of study. Nevertheless the chemistry of the carbon compounds is that part of the science which deals with those phenomena of animal and plant life which might most readily attract his attention. Both in schools and colleges the system of teaching adopted is, in Dr. ARMSTONG'S opinion, too mechanical and does not sufficiently develop the faculty of reasoning from observation. Instead of merely setting the student at first to prepare a variety of gases, he would require him to solve a number of problems experimentally, the idea of measurement being introduced early in the course, as in the determination of the composition of air or water quantitatively as well as qualitatively. This idea is worked out in the paper in a syllabus, which is, of course, too long for more than bare mention here, but which is said to have have given most satisfactory results during four years' experience. The only serious difficulty met with has been one that we are afraid is common to all systems of teaching, that of inducing students to give themselves the trouble to consider what information is gained from a particular observation; in fact, to be "properly inquisitive."

THE CAMPAIGN AGAINST SECRET REMEDIES IN GERMANY.

THE last number of the *Archiv der Pharmacie* contains as a fly-sheet a copy of the agreement between the Mecklenburg Medical Association and the Mecklenburg Section of the German Pharmaceutical Association, respecting combined action for the suppression of the traffic in secret remedies, which, as was mentioned a few weeks since, the latter Association has resolved to attempt to extend to other districts. The agreement first states as an axiom that it is for physicians to cure and for pharmacists to make up the medicines, and then proceeds to define the duties of the contracting parties. The medical men engage not to recommend to their patients any secret remedy, and the pharmacists that they will not lend their names to any quackish advertisements of such articles. The favouring of drug shops by medical men is to be combated with all available means, as opposed to the interests of the public. In order to carry out this agreement practically provision is made for the formation of a Commission to continue during one year and in which medical men and pharmacists are to be represented by an equal number of members. This Commission is to be instructed by both the Associations, in all cases of contravention of the law against the selling of secret remedies, to seek in the best interests of the public to obtain a cessation of the practice, and not to hesitate to put the law in force in such cases. The Commission has further to ascertain whether the existing legal provisions are sufficient for the accomplishment of the above objects, and if in this respect there exist deficiencies, or if through the non-application of the existing laws by the proper authorities, the prosecution of the objects of the Commission is hindered, joint representations are to be made in the proper quarter by the Presidents in the name of the two Associations.

We understand that the official opening of the new premises of the Pharmaceutical Society of Great Britain, at 36, York Place, Edinburgh, has been fixed for Thursday, the 13th of November, on which day a Soirée will be held in the new rooms by the Society.

* * *

Messrs. Schieffelin have put on record in the *Druggists' Circular* two cases of the spontaneous heating of the compound that is sent out under the name of "fly stone" or "cobalt." According to the Dispensatory this article is an impure arsenide of cobalt, iron, etc.; but in Gehe's Catalogue it is quoted under "arsenicum metallicum," and it would appear to be, as a rule, metallic arsenic in fine powder with more or less admixture of impurities. In the cases in question the "fly stone" seems to have contained an unusually large proportion of the metalloid, and the heating, which when discovered had become very intense, is attributed to the rapid absorption of oxygen from the atmosphere, increased probably by the "cobalt" having been packed immediately after grinding without undergoing the usual exposure.

The New York *Pharmaceutische Rundschau* calls attention to the fact that whilst out of the 2500 members of the British Pharmaceutical Conference, only 78 attended the recent meeting at Hastings, and the American Pharmaceutical Association was able to attract only 135 members to the meeting at Milwaukee, from the 26,000 drug stores in the United States; in Germany, where there are about 6850 proprietors and managers of pharmacies, the meeting of the German Pharmaceutical Association in Dresden was attended by 375 members. The inference drawn by our contemporary is that the German Association is the only one that has proved itself to be abreast of the time and in a prosperous and active condition.

* * *

A correspondent of the *Lancet* recommends honey as the best vehicle for the administration of quinine to children.

* * *

An order has been issued from the Brooklyn Department of Health forbidding the use in that city of tin-washed copper fountains or vessels composed partly of copper, lead or other poisonous substance for the storage of soda and mineral waters, syrups, or flavouring extracts, in which it is possible for the liquids to come into contact with the noxious metals. A similar prohibition is issued in respect to faucets and pipes.

* * *

A correspondent conversant with the protection of inventions by patent informs us that he has observed exhibitors of unpatented inventions are not generally aware that their position is affected by certain provisions of the Patents, Designs and Trade Marks Act, 1883, and he wishes us to point out that a six months' protection of unpatented inventions so exhibited is no longer accorded unconditionally. Such protection, he reminds us, is now obtainable only by compliance with the requirements stated in section 39 of the above-mentioned Act and rule 17 of the "Patents Rules." The requirements in the section referred to are--that (*a*) the exhibitor must, before exhibiting the invention, give the Comptroller the prescribed notice of his intention to do so; and that (*b*) the application for a patent must be made before or within six months from the date of the opening of the exhibition.

* * *

The extended use of pyrethum flowers for insecticidal purposes to orchards and vineyards has directed attention to the systematic cultivation of the plant. It is stated that at Atwater, California, a single manufacturing company has four hundred acres of land devoted to the growing of *Pyrethrum cinerariæfolium*.

* * *

The first meeting for the session of the London Section of the Society of Chemical Industry will be held on Monday, November 3, at 8 p.m., in the Chemical Society's Rooms, Burlington House, when Mr. Deering will read a paper on "Some Points in the Examination of Tallow and Some Commercial Oils, especially for Acidity."

* * *

At the meeting of the Chemists' Assistants' Association, to be held at 103, Great Russell Street, on Wednesday next, the 29th inst., at 9 p.m., a paper will be read by Mr. W. J. Frankish, M.R.C.S., upon "The Chemistry of Digestion."

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

October, 1884.

15th.—Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Symons, Tanner, Taylor and Thresh.

MAJOR EXAMINATION.

Six candidates were examined. *Four* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Cripps, Richard Augustus .....Upper Holloway.
Jackson, Frederick .....Manchester.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Sixteen* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Annal, Henry Sinclair.....Fishguard.
Barritt, Ernest Henry..... .....Colchester.
Barton, John.....Warwick.
Bowes, John William .....Pocklington.
Buxton, Thomas .....Belper.
Campbell, William Miller .....Paisley.
Cave, James Robert.....Windsor.

16th.—Present as on the 15th. Dr. Greenhow attended on behalf of the Privy Council.

MAJOR EXAMINATION.

Six candidates were examined. *Five* failed. The undermentioned *one* passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Hart, Thomas .....Darlington.

MINOR EXAMINATION.

Twenty-four candidates were examined. *Seventeen* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Crassweller, William Ellis .....Bury St. Edmunds.
Ellison, George Reed .....Whitby.
Francis, James Bridge.....Wrexham.
Gregson, Joseph .....Manchester.
Hassall, Stephen .....Eton.
Haywood, William Henry .....Liverpool.
Livesey, William Forrest .....Preston.

22nd.—Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Symons, Tanner, Taylor and Thresh.

MINOR EXAMINATION.

Twenty-eight candidates were examined. *Nineteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Judge, Edgar Harvey.....Newark.
Kirton, William Henry .....Boston.
Lloyd, Isaac Thomas .....London.
Marratt, Thomas..... .....Great Gonerby.
Marshallsay, Richard Jeanes...Wareham.
Menhinick, Chas. Hy. Foott ...Stonehouse.
Monk, Frederick Albert.....Alton.
Morris, Henry Wm. George ...Charlburg.
Olds, Arthur Charles .....Liverpool.

23rd.—Present as on the 22nd. Dr. Greenhow was present on behalf of the Privy Council.

MINOR EXAMINATION.

Thirty candidates were examined. *Nineteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Pimm, Henry Arthur .....Torquay.
Rees, John .....Aberystwith.
Richards, John William .....Pontypridd.
Smith, John Henry .....Coventry.
Steeples, William Stanley .....Ripley.
Topham, Thomas.....Mirfield.
Tucker, Percy .....Exeter.
Tudor, William Thomas.....Brecon.
Waldron, John Henry.....Chertsey.
Wheeldon, William Henry.....Derby.
Worsley, William.....Wigan.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's examination:—

Certificates of the University of Cambridge.

Browne, Frank..... .....Northampton.
Calvert, Albert Matheson .....Belper.
Clark, Owen Aly .....Bury St. Edmunds.
Dixon, William Isaac .....Sevenoaks.
Ellis, Jeremiah.....Batley.
Humble, Arthur Bawtree .... .Putney.
Knight, Jesse .....Leeds.
Leytham, Thomas Arthur .....Lancaster.
Linstead, Edward Flatman ...London.
Smith, Richard Sydney .....Dartford.

Certificate of the University of London.

Allenby, John Edward .....Helmsley.

Certificate of the University of Oxford.

Foster, James .....Cleveland, Ohio.

Certificates of the College of Preceptors.

Best, Harry Herbert .....Leeds.
Haslop, George.....Oldham.
Marsden, Prosper Henry .....Manchester.
Spurr, Herbert Edward .....Leeds.
Summers, Stanley .....London.

Certificate of the Faculty of Physicians and Surgeons of Glasgow.

Carswell, Thomas.....Paisley.

Certificate of the Incorporated Law Society.

Rae, James .....Alderley Edge.

Certificate of the Royal College of Surgeons of England.

Grigson, Philip.....Watton.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The first general meeting of the thirty-fifth session was held at the Royal Institution, on Thursday evening, October 9; Mr. Edward Davies, President, in the chair.

The minutes of last meeting were read and confirmed and, sundry donations having been announced, Mr. Alfred John Scott, was unanimously elected a member.

Dr. Symes drew attention to a statement on the circular of the School of Pharmacy, to the effect that pharmacy students were admitted on same terms as medical students. He was under the impression that they could enter on more liberal terms than medical students.

The Honorary Secretary was instructed to inquire further into the subject and report.

Mr. J. S. Ward exhibited a specimen of what he believed to be an old sample of guaiacum resin.

Mr. Conroy thought from its appearance that it was powdered guaiacum hardened again into a gummy mass.

The President, Mr. Edward Davies, F.C.S., F.I.C., then delivered his inaugural address on—

The Relation of Chemistry to Health.

The President commenced by laying down the proposition that, in its widest sense, health is "a sound mind in a sound body," and although we have no medicine revealed by chemical science which can "minister to a mind diseased," yet on the health of the body depends, in no small degree, the proper discharge of the functions of both our mental and moral faculties. The various physical sciences, electricity, light and heat, he said, have all their relations to health, but chemistry is most intimately connected with a body formed of chemical substances and whose various functions are, in a great measure, chemical processes. He then proceeded to consider chemistry in relation to health under the various heads of food, including water and air, medicine, disinfectants, dress and dwellings.

Food was defined as including everything taken into the body in order that its functions may be properly carried on, and the waste arising from the animal processes repaired. Air, it was pointed out, is, of all things, that which is continually needed, Thirst and hunger may be endured for a time, but deprivation of air speedily brings death. Air is being constantly taken into the body, so that in one day about 30 lbs. of air, or say one-fifth of the weight of the body, is inspired and breathed out again. By the air floating matters are brought in the closest contact with the body, injurious gaseous substances are taken into the blood, germs of disease come under the most favourable conditions for absorption, and everything shows the importance of having this prime necessary of life in the purest possible condition. When the composition of the air was first understood as consisting of oxygen and nitrogen, it was natural to suppose that the solubility or otherwise of the air was dependent on the proportion of oxygen or "vital air." The rough means adopted in the analysis gave results varying to a considerable extent, and the theory received some support by rejecting those observations which opposed it and accepting those which were in accordance with it. As more exact methods came into use it was found that the differences in the composition of the air as relates to the percentage of oxygen were too small to be readily determined, and except in extreme cases were of no practical importance. Attention has since been directed with more success to the determination of the CO_2, which admits of more easy and rapid estimation and gives valuable information as to the suitability of the air in enclosed spaces, such as rooms and steerages of ships. As to the causes which affect the air outside little is known. Attempts have been made to determine the amount of organic matter in the air and to collect the germs floating in it and cultivate them. The first has not yet given definite results, and the second is biological rather than chemical. The only remaining factor directly affecting health in the air is the oxidizing substance known generally as "ozone," but, the speaker said, whether its influence is beneficial or injurious or unappreciable, is a question which is certainly not settled beyond the reach of doubt.

Water was then referred to as the next most important substance used as food, and to chemistry we are indebted for information about its mineral constituents, its organic matters and its metallic contaminations. Mr. Davies continued:—The saline matters are usually little regarded, but as mineral waters often differ from ordinary drinking waters by the larger proportion of some saline constituents, I do not think that they ought to be disregarded. It seems generally admitted that a good water should not contain more than 30 gains of salt per gallon, and that there is a minimum below which it is undesirable to go, but we lack information as to the influence of a larger or smaller proportion of magnesian salts. When calcium or magnesium carbonate is too abundant

chemistry furnishes us with a simple means of softening the water with lime, at the same time removing part of the dissolved organic matter, but also taking away the free carbonic acid. The question of filters, though partly mechanical, has also its chemical side. Ordinary filtration through porous materials, as sponge, sand, flannel, etc, only removes suspended matters, and those not perfectly, whilst those vegetable or animal matters which are retained by the filter soon undergo decomposition, and favour the development of low forms of life, rendering the protection supposed to be afforded a snare of the worst description. The trouble of continually replacing the filtering material is too great to allow of its being done with anything like a sufficient regularity, and in some filters the filtering material is almost inaccessible. Carbon for a time will no doubt remove much dissolved organic matter, but it soon loses its efficiency. Silicated carbon seems to be better, but the reduced iron filter has high recommendations. Professor Wanklyn has experimented on silicated carbon filters, and finds that nitrogenous substances, such as quinine, morphine, strychnine, are entirely removed from solution by them. In one experiment 8·841 grains of strychnine having been dissolved in a gallon of water, after filtration the water had no bitter taste, and Professor Wanklyn drank as much of it as had contained 6 grains of strychnine without any effect being produced. If filters can be dispensed with altogether it is much the best, whilst cisterns are an abomination which cannot be too strongly reprobated. Water for drinking should be always drawn direct from the main, and hence the importance of a constant supply. In cisterns some of the water always remains, we have only to look in our water jugs to see that suspended organic matters from the water settle to the bottom of water at rest, and these carry down with them most of the living organisms. Thus at the bottom of the cistern there is an ever increasing mass of corruption, and as cisterns are generally put where they are almost inaccessible this may go on for an indefinite period. The material of which the cistern is composed is also of importance. Lead ought to be forbidden by law, and is not nearly so much employed as it used to be. Cases of lead poisoning arising from the use of contaminated water are, however, not extinct, and it must be remembered that the soft waters usually supplied to our towns dissolve a perceptible amount of lead by lying in the pipes during a single night. Hence the tap should be as near as possible to the main, and should be in the most convenient place from which water can be drawn, or it will not be used in spite of all orders. The question of water analysis is too wide to be entered upon. Wanklyn's, Tidy's, and Frankland's processes have all their own good points, though no one can give all the information we need to pronounce positively upon the quality of a water which is of doubtful purity. Very good or very bad waters can readily be determined, but much remains to be done. We have no means of estimating the total amount of organic matter in a water, and still less of distinguishing between the harmless and poisonous organic matter. The microscope should always be used in conjunction with purely chemical methods."

The President then referred to the services rendered by chemistry in distinguishing food materials into carbohydrates and albuminoids and finding the proportions of each in articles of diet, making it practicable to draw up dietary tables for prisons, etc. It also showed the absurdity of trying to build up an animal structure on starch, especially when not only had waste to be provided for, but the large supply of albuminoids required by a rapidly growing body. Infants are still, however, too often expected to make bricks without straw, or rather without clay, when fed with arrowroot, sago, or corn flour. This was even worse in the case of very young infants, whose secretions are not fitted to digest starch at all. Another useful application of chemistry to food was in the providing proper diet in cases of diabetes or undue corpulence. In each case the supply of carbohydrates must be diminished as far as possible, as in diabetes they go to make sugar, and in corpulence to make fat.

The application of chemical knowledge in the detection of adulterations of food was referred to, and the difficulty was pointed out of deciding what shall be considered a standard article, especially in the case of milk. The speaker also alluded to the subject of butter substitutes, and whilst condemning as indefensible the sale of them as butter, expressed his opinion that a great deal of nonsense has been talked and written against them *per se*. Referring to the practice of using boric and salicylic acid, bisulphite of lime and other compounds to prevent decomposition and change in articles of food, Mr. Davies said he considered it doubtful whether the use of an agent having distinct medicinal properties is desirable as an ordinary constituent of food, though strictly this would include beverages containing phosphates and hypophosphites, which have been proposed as non-intoxicating drinks, and the use of which does not appear to have been attended with injurious results.

The influence which chemistry has exerted on medicine was then referred to as perhaps the most important of its relations to health. At one time all medicines were drawn from plants, with a few such as mummy and vipers' flesh from animals. If we add to these bleeding and outward applications, sometimes of an heroic nature, such as actual cautery, we have exhausted the *répertoire* of an ancient physician. When Basil Valentine introduced antimonial preparations, the old physicians looked askance at such an innovation, and, as Dr. Sangrado is made to say, notwithstanding the almost universal failure of his favourite remedy of bleeding and warm water, he did not see that the chemists with their kermes did any better. But the contest was an unequal one, and by degrees one chemical remedy after another had crept into the pharmacopœias until to-day they occupied a very respectable portion of those fearsome books. In recent years a more ambitious step had been taken and attempts had been made to prepare artificially bodies that are formed in nature, as well as others analogous to them, some of which had been introduced into medicine, and of this latter class, reference was made to quinoline, kairin and picric acid.

Superior even to the restoration of health, the speaker ranked the prevention of disease, and in this field, he said, chemistry has made great advances. In old times substances possessing powerful odours were used for this end, and although in many cases foul smells were only masked, and their causes left untouched, recent discoveries on the power possessed by essential oils during their oxidation of forming peroxide of hydrogen showed that some real action for good may be exerted by camphor, turpentine and similar bodies. But these must yield to modern discoveries, and without entering upon a discussion of the various antiseptics recently proposed, he thought there could be no doubt that chlorine and carbolic acid leave all ancient antiseptics in the shade.

After alluding to the influence of dress upon health, and the choice of pigments for dyeing, the President concluded by saying:—"Corporations and town commissioners are becoming alive to the necessity of the case, and either voluntarily or compelled by a central authority, are making some provision for a proper observance of the laws of health. Medical officers of health are being appointed over the country, and great are the benefits which have resulted from their labours, but they need greater powers, and even then I fear that they cannot do everything. I fear to appear to advocate the claims of the profession to which I belong, but I think the doctors who best appreciate the importance of the work to be done will agree with me they have not the time and appliances to perform many of the operations which should fall to their lot to do. To take one illustration, water analysis is a process of such delicacy, and requires such an amount of care and time, that a docto

with his public duties and his private practice cannot do more than deal with the most flagrant cases. I think that a chemical officer of health should work with the medical officer. In a large town or in an extensive district each would find work to do, and thus by the combined agency of the doctor and the chemist life in our crowded towns would be rendered more bearable, mortality diminished, and a strong and robust population be reared to carry on the traditions of our country's eminence in arts, sciences, business and labour, and if need be to defend our soil against 'a world in arms.'"

Dr. Symes said he had listened to the address with the greatest possible interest, and had much pleasure in proposing a hearty vote of thanks to the author. He considered the subject had been treated in a most masterly manner and was specially interesting and of value to pharmacists.

Mr. M. Conroy seconded the vote of thanks and said that he quite concurred in the President's strictures on the pernicious effect of water filters in everyday use.

Mr. A. C. Abraham having supported the motion, it was put to the meeting and carried by acclamation.

The President, in reply, stated he considered that every chemist and druggist should make himself qualified to give a reliable opinion on articles of food, etc., that came under his notice, and in small towns and villages he ought really to be competent to act as the local authority in all such matters in case of need.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

Glimpses of Pharmacy in North America.*

BY ALFRED H. JACKSON, B.SC., M.P.S., F.C.S.,

Associate of Owens College, Manchester.

These brief observations were made during a recent and rapid tour in Canada and the United States. Primarily, I was attending the meetings of the Science Association; but, as a pharmacist, I took special note—as occasion offered—of the state of pharmacy amongst our transatlantic cousins.

The Dominion of Canada.—In Montreal, province of Quebec, pharmacies were numerous, most of them being large, elegant and well-fitted. I only heard of one co-operative store, and it retained the services of a pharmacist but did not dispense prescriptions. They make the bulk of their own preparations, but buy extracts, fluid and solid, pills, coated and compressed, from the wholesale houses; also many of them put up proprietary medicines.

The bulk of the people are French and that seems to be one of the reasons for the lack of union and dearth of either social or intellectual intercourse amongst the pharmacists there.

Mr. Bemrose--a Bloomsbury Square man—is the Professor of Pharmacy. Mr. A. H. Mason, who has succeeded to the business of Mr. H. Sugden Evans of Montreal, was to deliver the introductory address before their Pharmaceutical Association.

Failures were rare, but so were fortunes. The hours of labour were long; in town, from 8 a.m. until 9 p.m; in the suburbs, from 7 a.m. until 10.30 p.m; on alternate nights the assistants leave duty at 7 p.m. On Sundays the pharmacies were open in town from 9 a.m. until 11 a.m. and from 4 p.m. until 5.30 p.m; in the suburbs they were open all day. In the wholesale, the hours of duty were from 8 a.m. until 6 p.m; on Saturday they close at 1 p.m. The holidays in both branches were from one to two weeks.

The salaries ranged from zero up to £70 a year during apprenticeship; dispensers earned from £100 up to £150 a year, and managers from £200 up to £400.

In Toronto, province of Ontario, the population is more English than in Montreal or Quebec, and the town is growing more rapidly than either of the other two large towns. Hitherto the province of Quebec has declined to accept certificates of pharmaceutical competency from the Ontario province; but this will doubtless be changed now, for the province of Ontario, as well as that of New Burnswick, got a Pharmacy Act this year, by which the would-be pharmacist has now to pass through the successive stages of a preliminary examination, a three years' apprenticeship and a qualifying examination; the standard for this qualifying examination is said to be similar to our Minor, save for the lack of practical chemistry. The British pharmacist can practise in Canada, after exchanging his English diploma for a Canadian one. The pharmacist has a monoply of the title, of dispensing, and of the sale of poisons—though contained in proprietary medicines—except a few agricultural remedies. Every pharmacy must be under the personal charge of a pharmacist, and is subject to a tax of 16*s.* 6*d.* a year: offences against the Pharmacy Act are punished by a fine of £4 and costs. There were no co-operative stores; but connections between prescriber and dispenser were not unknown.

The charges for dispensing were 2*s.* for a 6-oz. mixture, and 2*s.* 6*d.* or 3*s.* for an 8-oz. one; where costly drugs, or strong doses were ordered, a higher rate was charged, but there was no uniform rate; each man charges what seems right in his own eyes. The salary for an outdoor assistant here was £100 a year.

In the better pharmacies every article that was sold was checked by passing through two persons' hands. The B.P. was the standard for all preparations named therein.

At Winnipeg, the capital of the province of Manitoba, the pharmacies were handsome; good prices were got for the articles sold, and large sums were turned over. At Ottawa, the little capital of Canada, chosen so as to silence the three claimants to that honour, Toronto, Montreal, and Quebec, one of the pharmacists showed me thirty prescriptions which he had dispensed that day.

The United States of America.—At the Sault Sainte Marie, a village with a lock enabling boats, passing from Lake Superior to Lake Huron, to avoid the rapids, I noticed in the one street of the place that the doctors were general traders, and that there were three drug stores close to each other.

At Niagara I learnt that the pharmacies were open from 8 a.m. until 10 p.m. on week days, and that attendance was customary on the Sunday. The assistants had leave of absence on one day or two evenings a week; their salaries ranged from £100 to £200 a year. The charges for dispensing were 2*s.* for a 4-oz. mixture with a 2-drachm dose; 3*s.* for an 8-oz. one, or only 2*s.* 6*d.* if the dose were 1 ounce.

At Boston, where I made the acquaintance of some of the leading exponents of our craft, there was a College of Pharmacy, which has been in existence for sixty years. Lectures and demonstrations are delivered by Professors Markoe and Davenport in chemistry, by Professor Bolles in materia medica and botany, and by Professor Patch in pharmacy. The lecture theatre would accommodate one hundred students, and in the chemical laboratory there are benches for two hundred and fifty pupils. The title of Ph.G., graduate in pharmacy, is given to all who fulfil the conditions of instruction, examination and fees. There is, however, no pharmacy law for Massachusetts. One leading pharmacist, whose name is well known in England, told me that he takes youths as apprentices, and allows them a salary of £10, £30, £50, and £70 during each of the four consecutive years of their pupilage; besides paying their tuition fees and allowing them time to attend lectures at the College of Pharmacy. The salaries of assistants vary from £100 up

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* Abstract of the Pharmaceutical section of the author's presidential address, in the Owens College, Oct. 16.

to £400 a year. Young men can board and lodge at from £1 to £2 a week, although rents in Boston are high.

At Philadelphia, Professor Sadtler showed me over the College of Pharmacy, the rooms of which seemed to be of similar size to those in the Bloomsbury Square school. The students' benches in the pharmaceutical laboratory were fitted with steam pipes, so that various pharmaceutical preparations could be made in a manner for which I know no parallel in any British school of pharmacy. In the chemical laboratories of some of the universities there were draught cupboards containing a series of assorted sizes of jacketed basins, into which steam could be turned on, and thereby solutions evaporated down, etc.

In some stores the pharmacy was open all night, so that two sets of clerks were employed, one for night duty and the other for day.

There were several other towns that I visited, but the details mentioned above will apply broadly to most of the towns.

Among the little technical items was the making of suppositories in the cold. A professor of pharmacy showed me that in his store the cacao butter and medicaments were rubbed together in a mortar; rolled out and cut into lengths by a pill-machine; then each little cylinder rolled into conical form by a wooden spatula held at the requisite angle to the table. He claimed that the ingredients were more uniformly mixed than by the process of melting and moulding.

Lateral space on the shelves of a pharmacy was saved at the expense of depth, by placing several bottles in a narrow, oblong case of wood or cardboard. The cases had no lids, and one of the sides of each was only half the height of the other, so that the labels on the bottles could be read when the cases were lifted down. The front end of each case bore labels corresponding to the bottles kept in that case.

For dispensing powders a Becker's short arm balance, with movable pans, was in use. For compressed pills a small nickel-plated iron mould was used. Pills were sent out in square, flat boxes.

In the oil-baths, paraffin wax was used instead of oil; so as to avoid the disagreeable smell attending the use of oil. Evaporating pans were jacketed to only one-fifth of their height, the advantages being that the liquids do not boil over so readily as when the jacket reaches higher up the pan; the portions of the contents which encrust the sides of the pan do not get charred; a greater quantity of liquid can be put in, and evoporation is quicker.

For vacuum filtering, Richard's modification of the Bunsen pump was used; it has a head action instead of a tail one, and can be attached to any convenient water tap.

Liquid extracts were abundantly displayed everywhere, and seem to be displacing most other liquid preparations for internal use. The courteous proprietor of one pharmacy, whose preparations have a world-wide repute, pointed out to me that there was a quarter of a million dollars' worth of liquid extracts in the room through which he was then showing me. The drugs are macerated, percolated and re-percolated in conical metal percolators until exhausted; then the spirit is recovered from the marc by distillation. Syrup of wild cherry bark and oleate of zinc are also extensively prepared.

In some of the libraries and in one pharmacy, I saw a perfect system of cataloguing, either books, drugs or any other article. There were a series of small drawers labelled, say, chemistry, biology, physics, etc. Each drawer contained a metal rod extending from front to back. On this metal rod were strung a number of cards, standing upon their edges. Each card was inscribed with the title of a book, and the marks referring to its position in the library. Thus, if the position of 'Attfield's Chemistry' were sought, the librarian would pull out the drawer labelled "chemistry," and, turning to the "pharmaceutical section" thereof, he would look along the slanting faces of the alphabetically arranged cards until he came to "Attfield," and then could read off the case and shelf where it stood.

The metal rods retain the cards in the drawers, so that they are not displaced by careless readers. The catalogue is always a perfect index to the library; because as soon as a new book is brought in a fresh card with its name and numbers is placed on the rod in the appropriate drawer; and when a book is lost, the card referring to it is withdrawn from its drawer. Thus there need be no book with its crowd of names being constantly interlined in one section, and left vacant in another; and it obviates the need of supplements and crossings out which are the vexatious complements to a printed catalogue. The cards and drawers to contain them are fitted in cases to any size by the makers.

Very unfavourable from a professional point of view was the prevalence of the "Ice-cream-soda-water" machine as the distinguishing badge of most pharmacies in the States. Besides the ordinary fruit and coffee flavours, there were special pharmaceutical ones, such as lactophosphates, cinchona, etc.; in one elegant pharmacy I was supplied with a glass of iced milk.

Prominent amongst the miscellaneous stock which characterizes the pharmacies in both the States and Canada, were cigars, brushes, toilet requisites, photographs and knickknacks. I was told in Boston that the ice-cream-soda machine had often to pay the rent.

Dispensaries where medicine could be had free, or for the nominal sum of 5*d.* (a dime), were regarded as a nuisance.

The "Campion" or "rebate" plan, suggested to the American Pharmaceutical Association at their annual meeting a year ago, has been put in force by the National Retail Drug Association, and said to be working well. It is a plan whereby many of the wholesale and retail houses have combined to supply proprietary articles and patent medicines only to those dealers who will sell them at the published prices. A list of the "cutters" is kept, and no more stuff supplied to them.

One advantage, which the pharmacists, both of Canada and the States, enjoy, is the retention of prescriptions. In various places huge folios of prescriptions were pointed out to me with evident pride, as indications of the amount of dispensing done. But they have a far higher value than that, as was illustrated in the following incident, which occurred at the elegant store of an accomplished New England pharmacist. He said to me that a certain physician had been ordering medicines in which tinct. lavand. co. occurred; he wrote one prescription without it, it was dispensed as written, and the prescription duly pasted into the pharmacist's book. The physician called to visit his patient the next day, and, seeing the bottle of colourless medicine, declared that it was wrong and marched off to the pharmacy with the bottle in his hand. On arriving there he demanded to see his prescription. The pharmacist—guessing what was the reason of this sudden visit—courteously handed him the book and pointed out his own prescription. As the physician read and re-read it, he perceptibly cooled down, and calling for a prescription blank he wrote a fresh one, not forgetting this time to put down the omitted tinct. lavand. co. The pharmacist then reminded him that it would be more graceful if he were to go and tell the patient whose was the mistake; which the physician accordingly did. It was the ability to show the prescription, and not a copy thereof, that saved the pharmacist from an unjust accusation and probable damage of repute and business.

Another advantage which our profession enjoys in the United States is that of preparing their own national Pharmacopœia. It was written by a Committee of sixteen pharmacists and nine physicians. The Com-

mittee only met twice. The sections of the Pharmacopœia were distributed amongst the various members, according to their special choice ; the members then reported upon their sections to the Chairman ; these reports were hektographed, and a copy was then sent to each member of the Committee, after which they voted on the subject.

Generally speaking America suffers through its variety of Pharmacy Acts, as well as through its lack thereof ; for in many towns no registration is needed, so that any one—qualified or unqualified—can set up in practice. It will be better for the country when Congress shall have passed an Act for all the States ; though at present this seems to be more remote than the "International Pharmacopœia."

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of the members of this Association was held on Tuesday evening, October 21. Mr. A. Smith read a very interesting paper on "Cinchonas."

The essayist commenced by giving a brief account of the history of cinchonas, stating that quinine-producing trees were first heard of in Europe in 1638—two hundred and fifty years ago—owing to the Countess of Chinchon having been cured of fever by means of some preparation of the bark. This lady brought some of the "powder" back to Spain, with her aid it soon became famous by the name of the "Countess's powder;" but its name was afterwards changed to "Jesuit's powder," owing to the Jesuits extending its use. It was not used much beyond Spain till about 1680, and even then little or nothing was known of the trees yielding the powder. A scientific party, however, from France visited Peru in 1737, and one of the number, La Condamine by name, drew up some details and diagrams of the Cinchonæ.

Another member stayed in Peru and collected much information of the flora of this distinct. After him a number of scientific men have investigated the subject, who indulged in small quarrels one with another as to which was the best variety, which the richest, who discovered it first, and so on. Speaking of the geography of the cinchonas, Mr. Smith pointed out that they grew principally in the region of South America between 19° S. and 10° N., and in addition to this zone they were cultivated in India, Ceylon, Java, and Jamaica. He then read a description of the climate of the region. The essayist then described the mode of gathering the bark by the "cascarilleros," saying that the outer skin is separated by blows from a club. then the bark is sharply cut down to the wood and slipped off in flats, which are then dried, the thickest ones being kept flat by piling up, the thinner ones being rolled into quills. After dressing, which takes some days, the man transports his bundle on his back to the outskirts of the forest, and brings it to his *major domo*, who superintends the sorting of the barks, which are then placed into canvas bags and sent on mules to the depôts, when they are packed either in cases or hides, in which form they come to England. After this followed a botanical description of the cinchona trees, and also the bark of the following varieties :— *Calisaya*, *Condaminca*, *Succirubra*, *Lancifolia*, *Micrantha*, and *Nitida*, which concluded a most instructive paper.

After the reading a discussion followed, in which Mr. A. E. Martin mentioned several useful characters of the official cinchonas by which they may be recognized. He also remarked that there were several narratives as to the discovery of the trees, one of which was that a traveller in Peru suffering from ague, came across a pool of water in which were some stumps or branches of cinchona ; he drank of the water and by the soluble portion of the bark in it was much relieved.

Messrs. Swinbourne (Treasurer) and C. G. Wood (Secretary) also took part in the discussion.

A vote of thanks to Mr. Smith was proposed by Mr. Andrews, seconded by Mr. Crossdale, and carried unanimously.

Mr. A. E. Martin, President, occupied the chair.

Proceedings of Scientific Societies.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The first ordinary meeting of the eighth session was held at the new premises, 103, Great Russell Street, on Wednesday evening, October 15, when there was a large attendance of members and visitors.

The minutes of the last meeting having been read and confirmed, the President, Mr. Richard Winfrey, delivered—

The Inaugural Address.

Referring to the honour the Council had conferred upon him, by electing him to fill the Presidential chair, Mr. Winfrey thanked them for reposing so much confidence in him. He joined the Association, on first becoming an assistant in London, and he could say, without hesitation, it had afforded him a great measure of instruction and recreation. He had taken no little interest in its welfare in the past, and he desired its future prosperity, and he felt it was solely because of this that the Council had thought fit to elect him to this position. The gentlemen who had preceded him in the chair were lights in the pharmaceutical world, and had qualities for the position which he could not possible lay claim to, that it was only by the aid and help of the members he should be enabled in any measure to succeed in fulfilling the duties they had performed so well. The past Presidents, in addressing them, had credentials which went far to inspire their words with wisdom and force; from no such vantage ground could he address them that night. He must speak to them as one of themselves or not speak at all. In reviewing the past history of the Association, he pointed out that it had had struggles in infancy which, thanks to past pioneers, had been overcome ; that during the last few sessions it had continued to grow and become more firmly established, and now, he contended, was the opportunity to excel. They had the experience of past sessions for their guide ; they had powerful friends outside who had been drawn towards them by persevering efforts, and it remained for them to reap the benefit of all this preparation and to make this the most successful session that had hitherto been held. They might possibly not fulfil their most sanguine expectations. "Life is ever a compromise between the aspirations of our best moments and the obstacles that mar their fulfilment," but he felt they were bound to have a fair measure of success if they only pulled together. At the inaugural meeting of the Association in June, 1877, the principal resolution proposed and carried was:— "That this meeting feels the desirability of an organization for the purpose of social intercourse and promotion of good feeling amongst assistants, and for the discussing of all matters affecting their welfare." And they still intended to stick to the text of that resolution. He wished to impress upon the members the need of recruits. Last year the numerical strength of the Society was not, from a variety of causes, quite so great as the year previous, and many gaps had been made in their ranks since they adjourned in the spring. An association of that kind was naturally limited in its membership, but two years ago they numbered one hundred, and he should like this session to exceed that if possible. At three Council meetings recently held upwards of thirty new members had been nominated by members of the Council and elected, so evidently they (the members of Council) were doing their share of the recruiting, and it remained

for individual members to do the same. What he would suggest would be that each member should pledge himself to introduce a new one before the session was two months old. He felt sure it could be done without much effort. In that way their numbers would be doubled, and it would be a division of labour for which the Council, and more especially the secretaries, would be very thankful. Referring to their change of address, he said for some time past the rooms in Conduit Street had provided insufficient accommodation, and although they had failed to obtain anything more suitable in that immediate neighbourhood, he trusted that 103, Great Russell Street would prove as adaptable; that they would not lose any of their "West-end" members or see them less frequently, but on the other hand, it might prove an inducement to obtain an increased number of representatives from the City. At any rate they were now literally under the wing of the Parent Society. Allusion was then made to the programme of meetings arranged for the first half of the session up to Christmas. Papers were announced to be read by Mr. Frankish, L.R.C.P., Lond., M.R.C.S., Eng., Mr. Holmes, F.L.S., Mr. G. W. Watts, Mr. J. O. Braithwaite (Vice-President), Mr. C. E. Stuart, B.Sc., of Newcastle, and Mr. Baily (Secretary), all of which will be duly announced in the *Pharmaceutical Journal*. This embraced what he would call the serious work, and it would ill become him (the speaker), a junior to many present, to lecture them on the wisdom of taking opportunity to increase their stock of knowledge, but he would quote them a sentence from Mr. Thiselton Dyer's recent address to the students at Bloomsbury Square, which would have more weight than any words of his, and the truth of which would be apparent to all of them. "For my part," Mr. Dyer said, "I have no doubt that we are in the grip of an inexorable and irresistible movement, the tendency of which will be that all of us who do not want to be stranded will have to learn a great deal more and learn it a great deal better. I think (said he) pharmacy seems to be particularly in the thick of it." As to what he would call their less serious work,—the musical and social evenings, etc.,—he had equal pleasure in inviting their attendance. The Association was formed for a twofold object, instruction and recreation. Shakespeare truly says—

> "Sweet recreation barr'd, what doth ensue
> But moody and dull melancholy?"

And their business being necessarily of such a seclusive kind, that even those who were endowed with a good portion of animal spirits were liable to become somewhat jaded by ten or twelve hours per diem behind the counter, these evenings were intended to help to counteract or remedy that kind of indisposition. And he would commend to them the timely advice which Professor Attfield gave the other evening to the students, concerning the wisdom "of devoting some hours of the day, or of the week at all events, to healthful recreation." He said arrangements were being made for a conversazione at St. James's Hall on November 19. Last year they passed over without one, so they felt the time had again arrived when another might with advantage be held. A Committee had been appointed to carry out the arrangements, which would be duly announced, and they intended making it one of the successes of the session. The present condition and future prospects of pharmacy were then referred to at some length. In the course of his remarks he observed that in this race of life the struggle for existence seemed to get keener and keener, and that they were continually hearing dark forebodings of the future of pharmacy. What with co-operative stores and the like outside their ranks, and the now not uncommon "cutting chemist" in their ranks, things perhaps did not go so smoothly as they might. Not that he wished exactly to hold all "cutting chemists" up to scorn. Some of them were indeed contemptible enough; but there were cutting chemists and cutting chemists. Some he knew had been forced into it by circumstances over which they had but little control; it had, he feared, often resolved itself into the very pertinent question, Is half a loaf better than no bread? and possibly had he been placed in the same position he might have done likewise. Those of them who were accustomed to the conduct of business in "West-end" houses, possibly did not give sufficient weight to all the *pros* and *cons*, but were prone to jump too rashly to conclusions, and to condemn the "cutting chemist" merely because his *modus operandi* was distasteful to their more refined taste. Whilst the system of "cutting" was much to be regretted, they must not blind themselves to its existence. It not only existed, but was spreading so rapidly that almost every town, large or small, in every county, had it to contend with either in a mild or aggravated form. It had taken too firm a hold of our trading system to be ignored or smothered. It must, at least as far as the greater part of the rising generation of pharmacists were concerned, be faced. He confessed at times these dark forebodings cast him down; but at others, in his stronger moments, he felt that after all the difficulty could be grappled with and overcome. If they consulted their friends in other walks of life they would find the same struggle going on, and the same change coming over the conduct of business. In the smallest country town the draper is forced to pay more attention to the rapid change of fashion, and run greater risk of making bad stock than he used. With the chemist, change of fashion and bad stock were small difficulties. A few new remedies were always coming out, and sometimes became bad stock, and Americans were prolific with their patent pills, but, compared with the drapers' difficulties, these were trifles. Then the grocer knew what it was to sell sugar at cost, and the tailor to have his best materials imitated with shoddy. As for the farmer, poor fellow! he was so hardly set with foreign competition that it was with the greatest difficulty he made both ends meet. The question of supply and demand was an infinitely more serious one with the agriculturist than with them. Again, in the professional world the struggle was just as keen. Parsons without pulpits, lawyers without clients, and even doctors without patients, were of everyday occurrence. So really he thought they might sum up, and be comforted in summing up, that they were no worse off than their neighbours, and, taken as a class, not quite so bad. What he regretted from their more immediate point of view was that the system of "cutting" must be bad for assistants. Traders who went in for infinitesimal profits must of necessity go in for cheap labour. At any rate, it stood to reason they could not afford to employ men who had spent considerable time and money over their pharmaceutical education, and who had qualified themselves to fulfil the duties of a pharmacist. They knew full well the class of men who applied for and obtained this kind of appointment. And they could further reason it out that whilst the demand for that kind of labour continued the supply would be forthcoming. He did not see how pharmacy could flourish with "cheap drugs" for its maxim, and he was sure assistants were still less likely to flourish with a cheap labour market. He felt confident that as the public became more enlightened with regard to things pharmaceutical,—and they were doing so rapidly,—they would not, at any rate for the dispensing of their medicines, either patronize cheap drugs or a cheap and inferior labour market. And a further consolation was that whilst this and other nations moved along at such express speed, the human frame was at such severe tension, that it was certain the aid of their drugs and chemicals would be even more and more required. If he had come to right conclusions, well, whilst it might be true as to "the survival of the fittest," surely they could fit themselves to be amongst that number when the time arrived to seek their fortunes in more extended spheres. He would observe

here, that the usefulness of an institution was portrayed in the success of its individual members. And whatever mistake they had made in their present selection, it was with lively satisfaction that he could inform them of the success that was attending their four past Presidents, who had gone into business in different parts of the country. They were personally known to him, and he could vouch that they were good specimens of "the survival of the fittest," and he felt this was not only encouragement for them, but proved that the meetings of the Association were in some degree helpful, by increasing their knowledge, by enlarging their ideas and by cultivating their social tastes and qualities so as to better fit them for any position that might be in store for them in the unknown future. In conclusion, he said they lived in an age of tremendous progress and they must all notice that the natural progress of social development is unmistakably towards co-operation and association in the best sense of the word. And if their Association tended even in the smallest degree to help them, as pharmacists, to perform their duties with greater efficiency, it was doing a good work. They would do well to remember that they had no right to live for themselves alone, that Society demands that they should seek the general advance rather than their own advantage; and they might depend upon it, that it brought its own reward, for if they attempted to contribute to others' welfare, they would most certainly contribute to their own. Let no one imagine that he had no influence. Whoever he may be, and wherever he may be placed, the man who thinks becomes a light. Sydney Smith said, "a great deal of talent was lost to the world for the want of a little courage," and another equally wise man said, "that God had sent his creatures into the world with arms long enough to reach anything if they choose to be at the trouble." And daily experience showed that it was energetic individualism that produced the most powerful effects upon the life and really constitutes the best practical education that they could receive. And here was the gist of the whole matter—more advantages were given to them than to their predecessors, consequently more would be expected of them. Do not let any of them pass over the work that lies to their hand. And to each he would say—

> "This above all: to thine ownself be true,
> And it must follow, as the night the day,
> Thou canst not then be false to any man."

Mr. G. F. Snow proposed a vote of thanks to Mr. Winfrey for his admirable and thoughtful address. He quite endorsed his remarks with regard to the progress of the society. He became a member very soon after its commencement, when they used to meet in Brewer Street, and he could testify to the increasing strength and usefulness of the Association. From what Mr. Winfrey had said they seemed to have a goodly promise of interesting papers, and the attendance that evening augured well that the session would be a most successful one.

Mr. A. M. Hickley had great pleasure in seconding the vote of thanks. As a new member he did not feel entitled to say much, but he felt sure the stirring address they had just listened to would stimulate them to help on the success of the session.

Mr. Winfrey made a brief acknowledgment, and after coffee and light refreshments had been handed round, the proceedings terminated.

BOOKS RECEIVED.

A Course of Qualitative Chemical Analysis. By the late Wm. Geo. Valentin, F.C.S. Revised and corrected by W. R. Hodgkimson, Ph.D., and H. M. Chapman. Sixth edition. London: J. and A. Churchill. 1884. From the Publishers.

Annual Report of the Board of Regents of the Smithsonian Institution for the Year 1882. Washington. 1884. From the Board.

Parliamentary and Law Proceedings.

Death under Methylene.

On Friday, the 17th inst., Mr. Coroner Brian held an inquest at the South Devon and East Cornwall Hospital, Plymouth, concerning the death of John Bray, aged 19, who expired that morning while undergoing an operation under methylene.

Mr. Wm. Square, F.R.C.S., surgeon of the hospital, said the deceased was admitted about three weeks ago, suffering from an accident while tamping a hole for blasting. It was thought desirable to unite a nerve which was severed and which made deceased's right hand useless. Uniting the nerve would have partly restored the use of his arm, but before doing that it was necessary also to remove some remaining portions of stone. The operation was undertaken at the distinct wish of the deceased. The house-surgeon and the assistant were also present. The methylene, which was decidedly safer than chloroform, was administered in the usual way. Methylene was in daily use, and there had never been an accident before in connection with their hospital. The heart of deceased was carefully listened to through the stethoscope before the methylene was administered, and there were no symptoms to lead them to suspect that deceased would be unable to bear it. Deceased was not the least nervous, having undergone a similar operation before. He was about the usual time going off before the operation commenced. He was not completely insensible when witness began to operate. Two pieces of stone were removed and witness was then going to commence the longer operation of tying the nerve, which would probably have taken three-quarters of an hour, when deceased suddenly died. All the usual methods were tried to resuscitate him, but without success. He had made a post-mortem examination of the deceased and had found the right lung rather gorged with blood and the heart a little hypertrophied on the left side. He considered the cause of death to be paralysis of the heart's action due to methylene. The number of deaths that occurred under methylene was given as about one in eight thousand. He had seen many thousands of cases during his twenty-six years of experience, and had never met with a death before.

The Jury returned a verdict "That deceased died from paralysis of the heart, caused by the administration of methylene under medical supervision and by medical direction; and we further find that the administration of the said methylene was necessary, was cautiously and properly administered."—*Western Morning News.*

ANSWERS TO CORRESPONDENTS.

H. Barnaby.—We do not think the data referred to are sufficiently comprehensive to allow of an argument being based upon them.

J. H. Webb.—We are not acquainted with the article.

Apprentice.—Because, we presume, the examination in question is not equal to the standard of the Preliminary examination.

Junior.—Martindale's 'Extra-Pharmacopœia,' published by Lewis, Gower Street.

E. Ryley.—Thanks for your communication, but we do not think any good purpose will be served by prolonging the correspondence.

Communications, Letters, etc., have been received from Messrs. Walker and Moore, Merck, Lindmann, Griffin, Selby, Dunstan, Elborne, Quero.

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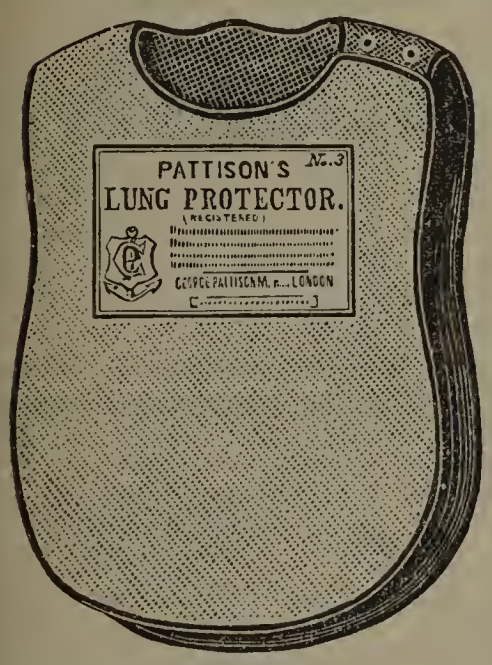

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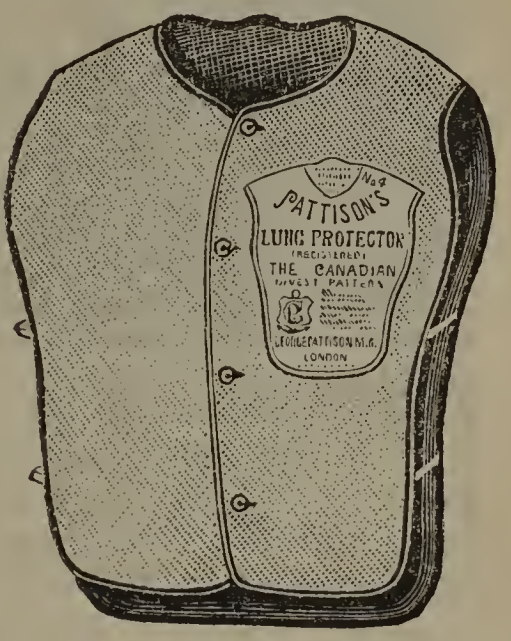

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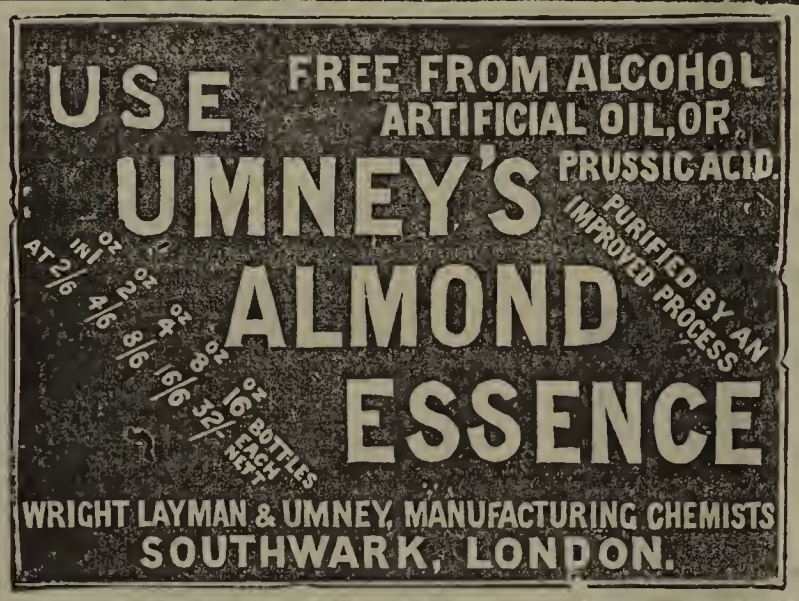

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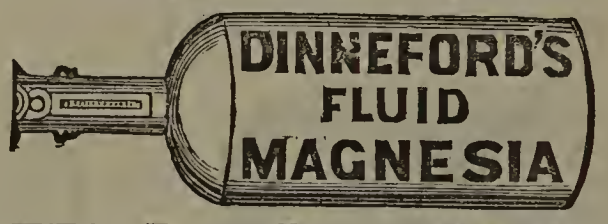

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INSTITUTED 1ST OCTOBER, 1868.

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Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

SEVENTEENTH SESSION, 1884-5.

The next term will commence on the 7th January, 1885.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

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December and February Minor.

The Morning Class daily, 10 to 1 a.m. Students can enter at any time, and for any period.

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All subjects are taught. Students succeed at every examination.

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THE

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The First Course of Lectures and Classes of this Session has now commenced, and is attended by a full class of Students. A Short Course, especially adapted for Students who have already acquired a knowledge of the subjects, will commence on Monday, October 27th. Should any candidates join then who are commencing their studies they will complete the full Course by February next. Fees to December, 6 guineas; to February Examinations, 9 guineas.

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The next Course of Lectures on Chemistry, Botany, Pharmacy, Materia Medica and Physics will commence on Monday, October 27th.

Students can enter at any time, but are advised to enter at the commencement of a Course.

Any diligent Student with ordinary ability, who is punctual in his attendance at the Lectures and Classes, may rely upon passing his Examination at the FIRST ATTEMPT.

FEES:—

To the December Examination	...	£5 5s.
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ASSISTANTS WANTED.

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The

Pharmaceutical Journal

AND

Transactions.

THIRD SERIES, No. 749.] SATURDAY, NOVEMBER 1, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
"The Month"	341
Corrosive Sublimate as a Surgical Dressing. By Sir Joseph Lister	346
Spiritus Odoratus and other Perfumes. By R. Rother	351
EDITORIAL ARTICLES AND NOTES:—	
The Board of Trade on the Weights and Measures Act	353
Notes:—The next Evening Meeting—Opening of the Society's New House in Edinburgh—Mr. Warton and Patent Medicines containing Poisons—Shop Hours Bill—Herbalists' Saffron	354
TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY:—	
Preliminary Examination	355
PROVINCIAL TRANSACTIONS:—	
Leeds Chemists' Association	357
Manchester Pharmacy Students' Association	358
Liverpool Chemists' Association	359
PARLIAMENTARY AND LAW PROCEEDINGS:—	
The Pharmaceutical Society of Great Britain *v.* Withnall	359
Poisoning by Phosphorus	359
The Sale of Savin for Saffron	359
Prosecution for Possession of Unstamped Weights	360
OBITUARY	360
CORRESPONDENCE:—	
The Estimation of Hydrocyanic Acid	360
Answers to Correspondents	360

CONVERSAZIONE.

OFFICIAL OPENING OF THE SOCIETY'S NEW PREMISES IN EDINBURGH.

The PRESIDENT, VICE-PRESIDENT and COUNCIL of

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The following papers will be read:—

"Approximate Constituents of Hedychium Spicatum."
By J. C. THRESH, D.Sc.

"On the Presence of Oxides of Mercury in Blue Pill, and in other Mercurial Preparations."
By HAROLD SENIER, F.I.C., F.C.S.

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NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 5th day of December next, at 12 o'clock precisely.

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Secretary and Registrar.

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Persons subscribing on or before the day of Election will be entitled to vote thereat.

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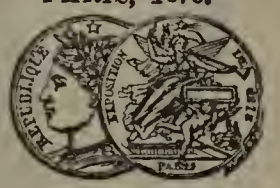

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NEPENTHE.

FERRIS & CO. *v.* GOODMAN.

Notice is hereby given, that by an Order of the Chancery Division of the High Court of Justice, made the 18th day of July, 1884, in the above action, it was ordered that the Defendant and others be **perpetually restrained** from selling, or offering for sale, any formula or recipe for "**Nepenthe,**" and from otherwise prejudicing the sale thereof by, or injuring the title thereto, or Trade Mark therein, of the Plaintiffs, Messrs. FERRIS & Co., of Bristol, Wholesale Druggists, the **Registered Proprietors thereof.**

And it was further ordered that the Defendant do pay the costs of the said action.

Dated this 12th day of August, 1884.

(Signed) CHILTON & GREEN-ARMYTAGE, Bristol,
Solicitors for the said Plaintiffs.

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RESPECTING

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The Original Preparation, as approved by the Medical Profession on account of its known composition and uniform strength.

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Messrs. BULLOCK & CO. beg to direct attention to an article by G. F. DOWDESWELL, Esq., B.A. (Cantab.), F.C.S., F.L.S., &c. on "Medicinal Pepsine and Artificial Digestion," which appeared in the *Practitioner* for March, 1880. In this paper Mr. DOWDESWELL gives the results of upwards of 200 experiments, which conclusively demonstrated the marked superiority of BULLOCK'S PEPSINA PORCI AND ACID GLYCERINE OF PEPSINE over all other preparations of Pepsine or form of Pepsine—English, French, German, or American—and confirmed the equally favourable reports of Dr. PAVY (1863), Professor TUSON (1870), and the late Professor GARROD (1878), as to the pre-eminent digestive value of BULLOCK'S PEPSINA PORCI.

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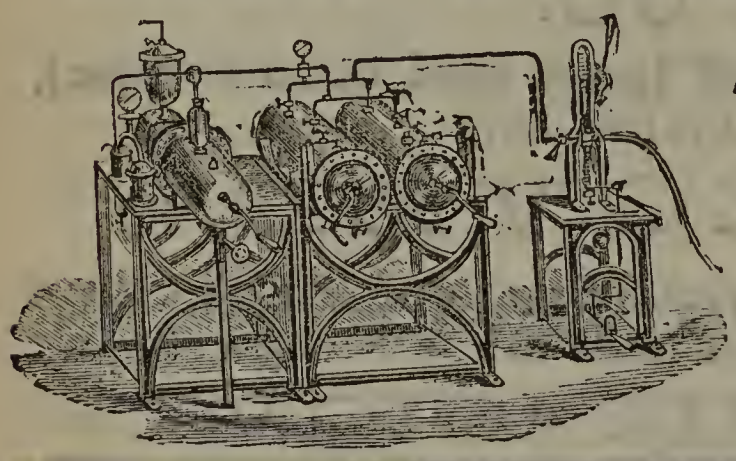

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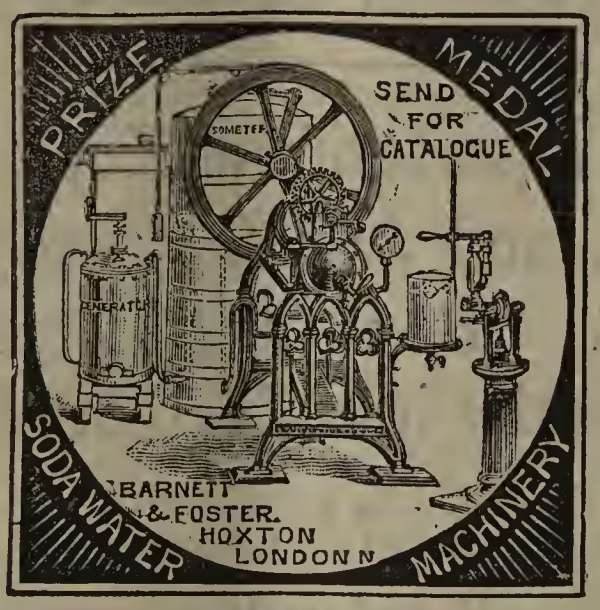

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No. 1, to make	700	doz.	Botts.	per	day	...	£70	0	0	*These are the same for any size Machine.*			
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The above quantities are for Lemonade and other Saccharine Drinks; if for Splits, reckon double; if for a very highly charged Soda Water, reckon half.

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OBSERVE!!—It is important that the Machines for the manufacture of Aërated Water should be of the very highest class, to produce the best results; and it is ill-timed economy to be tempted into buying cheap and worthless machinery, which is liable to get out of order soon, besides making very indifferent Waters. Purchasers must not overlook the fact that Soda Water Machines, like watches, can be made at any price.

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Quart size, 22s. per doz. } *by the*
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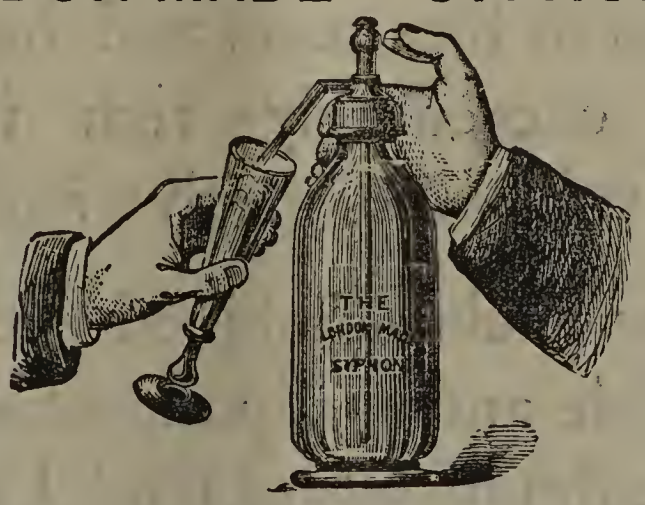

The high reputation this bottle has achieved is due to the fact of its being in every particular the most perfect yet introduced, and when compared with others in the market it stands pre-eminent. It is the most simple in its working parts, therefore the least liable to get out of order; it is the most easily opened, the lightest pressure on the handle being sufficient; it produces a more highly charged gaseous water than is usually obtained from syphons; it compares most favourably in appearance with any, and the metal top being entirely free from lead, the prejudice against syphon drinks is at once removed, as the liquid passes over pure tin only.

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THE LANCET reports of the Kepler Extract of Malt: "*The best known*, and *in this country the largest used Extract of Malt.* It is as distinct an advance in therapeutics as was the introduction of cod liver oil.

Professor Yandall, M.D., of Louisville, U.S.A., reports of it:—"The Kepler Extract of Malt is the best, and has the finest flavour of any I have seen; it is a very valuable preparation."

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"The Kepler Malt, combined with Cod Liver Oil, is the most palatable and easily digested of any form we have yet seen for administering Cod Liver Oil."

Burroughs, Wellcome & Co., Manufacturing Chemists, Snow Hill Buildings, London, E.C.

"THE MONTH."

A communication that promises to prove a valuable contribution to the interesting and important subject of peptonization has been recently presented by Herr Chandelon to the German Chemical Society (*Berichte*, xvii., 2143). It is well known that peroxide of hydrogen is decomposed with the evolution of oxygen in the presence of fibrin and organized tissue, as well as several metals and oxides, and it has been generally stated that this takes place without these substances undergoing change, whilst the non-evolution of oxygen from peroxide of hydrogen in the presence of other organic substances has been assumed to be due to the absence of any reaction. Herr Chandelon seems to have suspected that in this latter case there might be reaction, though it was not perceptible because the oxygen was used up in oxidizing the organic matter, and for the purpose of testing his suspicion he submitted egg albumen suspended in water to the action of nascent peroxide of hydrogen. Only negative results, however, were obtained, no such oxidation products as leucin or tyrosin being detected. Nevertheless it was observed that the albumen underwent some change, in that the volume of the precipitate produced by boiling the mixture gradually diminished, whilst the liquid after separation of the coagulum by filtration gave upon treatment with alcohol a copious precipitate, which upon being redissolved in water showed all the reactions of an albumenoid substance. Further investigation left no doubt that the albumen had, at least partially, been converted into peptone; it was therefore of interest to study the reaction more closely and isolate and identify the intermediate products. The conclusions at which Herr Chandelon arrived may be thus briefly summarized. Peroxide of hydrogen in the nascent condition peptonizes egg albumen, and peptonization may be considered a phenomenon of hydration, an opinion that is supported by the formation of peptone from albumen by reagents capable of fixing water, such as dilute acids, alkalies, etc., and its reconversion into albumen by a dehydrating material like acetic anhydride. It is suggested that the albumen (anhydride) gives up an atom of oxygen to the peroxide of hydrogen similarly as oxide of silver does, and that the two groups that had been united by the oxygen then combine with two hydroxyls. The conversion takes place by the same process as in digestion with peptic ferments. Thus the stages with (*a*) pepsine, acting in acid solution, are dyspeptone syntonine, propeptone, peptone; with (*b*) trypsine, in alkaline solution, they are dyspeptone globuline, propeptone, peptone; with (*c*) peroxide of hydrogen produced by electrolysis in acid solution the stages are the same as with pepsine in acid solution; whilst with (*d*) peroxide of hydrogen produced by barium peroxide, carbonic acid and water in neutral or alkaline solution they are dyspeptone proteine, propeptone, peptone. It will be seen, therefore, that any difference occurs in the first stage and appears to be dependent rather upon the acid or alkaline character of the medium than upon the reaction itself. The author therefore puts forward the hypothesis that the digestive ferments promote digestion by the production of peroxide of hydrogen. These results appear to throw light upon some unexplained phenomena met with by M. Béchamp in his investigation as to the constitution of albumenoids (*Pharm. Journ.*, [3], xiii., 66), and are in accord with the behaviour of the papaine ferment observed by M. Wurtz (*Pharm. Journ.*, [3], xi., 802). It would be interesting to know whether peptones so formed are devoid of the bitterness which is an objection in those formed under the influence of ferments.

The statements that have been put forward as to the remarkable power of lowering the temperature in cases of fever possessed by a substance that has been recently introduced under the trivial name of "antipyrin" have given rise to many inquiries as to its nature and source, but hitherto it has not been possible to say more than that it was an article sent out by a German firm, the composition of which had not been disclosed. The current number of the *Berichte* (xvii., 2032), however, contains a paper by Dr. Knorr which throws some light upon the question, and although the communication is very recondite and bristles with technicalities, it seems desirable to pick out a few of the salient points, so that pharmacists may have some idea as to the nature of a compound that they may be called upon to dispense. Antipyrin, according to Dr. Knorr, is one of a series of derivatives from a hypothetical base to which he has given the name "chinizin," representing it by the formula $C_9H_{10}N_2$. These chinizin derivatives are products of the action of diacetic ether upon one of the hydrazines, a class of bodies, it may be useful to mention, represented as containing the nitrogen group $=N-N=$, of which the free affinities are saturated either by hydrogen or alcohol radicals. Phenylhydrazin ($C_6H_5.H.N-.N.H.H$) is obtained by the reduction of diazobenze sulphonate with sulphurous acid. When equal molecules of it and diacetic ether react in the cold the elements of water are eliminated and the residue combines to form phenylhydrazindiacetic ether, which upon being heated to 100° C. parts with the elements of ethylic alcohol and is converted into methyloxychinizin.

$$\underset{\text{Phenylhydrazin}}{C_6H_5N_2H_3} + \underset{\text{Diacetic ether}}{C_6H_{10}O_3} = H_2O + C_2H_5OH + \underset{\text{Methyloxychinizin.}}{C_{10}H_{10}N_2O.}$$

Methyloxychinizin possesses the properties both of an acid and a base. But it still contains an atom of hydrogen easily replaceable by an alcohol group and the compound then loses its acid character and is converted into a base with a strongly antipyretic action. The conversion may be effected by heating in a tube to 100° C. a mixture of equal parts of methyloxychinizin, methyl iodide and methyl alcohol, decolorizing the product by boiling with sulphurous acid, distilling off the alcohol, treating the residue with strong soda ley, shaking the heavy oil that separates with ether and evaporating, when dimethyloxychinizin ($C_{11}H_{12}N_2O$) separates in lustrous crystals melting at 113° C. This appears to be the compound to which Dr. Knorr has given the name "antipyrin;" but it must not be confounded with another compound to which he has given a similar systematic name, di-methyloxychinizin, differing only by the introduction of a hyphen, that compound being a condensation product of two molecules of methyloxychinizin, represented by the formula $C_{20}H_{18}N_4O_2$. There are also two other isomeric dimethyloxyhydrazins that have been described as products of reactions with other hydrazins, but these are distinguished from the one named antipyrin by their acid character and being less soluble in water, antipyrin being very soluble. Indeed the paper well illustrates the difficulties that attend the nomenclature of such classes

of complex compounds with their Protean variations, "phenylizinchinizinohydrobenzolcarbonsaureester" being the name given to one of the new creations. In aqueous solution antipyrin gives with perchloride of iron a deep red colour, perceptible even when diluted to 1 part in 100,000; this reaction is common to most of the chinizin derivatives. With nitrous acid a dilute solution (1 in 10,000) gives a blue-green colour and a concentrated one a separation of green crystals of an isonitroso compound.

Some years since it was found that by heating cinchonine ($C_{19}H_{22}N_2O$) with phosphorus pentachloride and boiling the chloride produced with alcoholic potash a base devoid of oxygen was obtained, which was named cinchene ($C_{19}H_{20}N_2$), and that upon heating this base with concentrated hydrochloric acid methyl chloride and ammonia were split off and the elements of water taken up to form apocinchene ($C_{18}H_{17}NO$). Messrs. Comstock and Königs now report (*Berichte*, xvii., 1984) the behaviour of cinchonidine and quinine under similar conditions. They state that they have obtained from cinchonidine a base which in its chemical and crystallographic characters appears to be identical with cinchene and like it yields apocinchene. It is suggested, therefore, that the isomerism of the two alkaloids, cinchonine and cinchonidine, depends upon the different manner in which the elements of a molecule of water in the two alkaloids are combined with the cinchene. From quinine a corresponding base was obtained, containing the elements of a molecule of water less than quinine, to which the name "chinene" has been given.

Professor J. U. Lloyd calls attention to the fact (*Amer. Drug.*, Sept., p. 166) that there are two sulphates of berberine, and that the lemon-yellow crystalline powder obtained by heating a solution of commercial sulphate of berberine with ammonia water and shaking the solution with ether is not the free alkaloid, as has been assumed, but a neutral sulphate, the compound usually met with being a bisulphate. In respect to solubility in water the behaviour of these two compounds is the reverse of the two sulphates of quinine, the ordinary (bi)sulphate of berberine, $C_{20}H_{17}NO_4.H_2SO_4$, being only moderately soluble, whilst the new sulphate, $C_{20}H_{17}NO_4)_2H_2SO_4$, is very soluble.

In view of the unmistakable resemblance, both in composition and in chemical behaviour, which investigation has shown to exist between conydrine and tropine, the question presented itself whether the former might not, like the latter, exist in the plant organism in combination with an acid, and whether there might not occur in the hemlock a compound corresponding to atropine in belladonna, which with the elements of water would yield conydrine and an acid, just as atropine under the same conditions is converted into tropine and tropic acid. In order, therefore, to clear up this point, Professor A. W. Hofmann requested Herr W. Merck to examine the residual liquors from the preparation of coniine and conydrine in his establishment. The result was (*Berichte*, xvii., 1922) that Professor Hofmann received shortly afterwards a consignment of a crystalline compound having acid properties, which had been obtained from the alkaline liquor left after distilling over the coniine and conydrine by first supersaturating it with acid, and then treating it with ether and evaporating the ethereal solution. The acid was still strongly coloured and mixed with resinous substances, but after purification was obtained in yellowish lamellæ, melting with incipient decomposition and browning at near 230° C., and presenting the characters and having the composition of caffeic acid, $C_9H_8O_4$. It is interesting to note that this acid, which was first obtained by Hlasiwetz as a decomposition product of caffeotannic acid and afterwards prepared by Tiemann from the aldehyd of protocatechuic acid, has also been reported by Körner (*Pharm. Journ.*, [3], xiii., 246) to have been found in a mother liquor obtained in the manufacture of quinine from cuprea bark.

The test recently suggested by Mr. A. W. Gerrard for the tropine alkaloids (*Pharm. Journ.*, [3], xiv., 718), the production in an alkaline liquid of a red precipitate upon the addition of a 5 per cent. alcoholic solution of mercuric chloride, has been the subject of experiment by Dr. Schwessinger, who confirms Mr. Gerrard's statement in respect to atropine (*Pharm. Zeit.*, Oct. 1). But he reports that with hyoscyamine a red precipitate was not produced when 2 c.c. of the reagent was used to a milligram of the alkaloid, though he obtained it by using only two drops to the same quantity and gently warming. This difference of behaviour he suggests might be utilized to distinguish between atropine and hyoscyamine, for which purpose a 1 per cent. solution is preferable. With homatropine he failed altogether to obtain the reaction, only a yellow precipitate being formed, which disappeared upon further addition of the mercuric solution and warming.

During the past month several communications have been published upon the constitution of constituents of various essential oils, which, however, are, as a rule, almost too technical to allow of being usefully epitomized in these columns. Wormseed oil has been investigated by Messrs. Hell, Sturcke and Ritter (*Berichte*, xvii., 1970, 1975) and Messrs. Wallach and Brass (*Annalen*, ccxxv., 291). The latter authors confirm the statements of previous observers that the principal constituent of oleum cinæ is a compound having the composition $C_{10}H_{18}O$, which as being an isomer of borneol they propose to call "cyneol," and that this is accompanied by a certain quantity of hydrocarbons with a similar boiling point; but they have also met with another compound richer in oxygen and having a higher boiling point. Pure cyneol is a liquid having a characteristic but not disagreeable camphor-like odour, boiling at 176° to 177° C., and having a specific gravity of 0·92297 at 16° C. It is optically inactive, though the rectified oil from which it is obtained has been found to have a lævogyre rotation of 2·9°, due to other constituents boiling at higher temperatures. Oxidized by boiling with nitric acid cyneol yielded besides the lower fatty acids essentially oxalic acid, but no acid of the aromatic series, whilst the hydrocarbons ($C_{10}H_{16}$ and $C_{10}H_{14}$) accompanying it in the oil, yielded upon oxidation always more or less toluylic or terephthalic acid. Cyneol, by treatment with gaseous hydrochloric acid is converted into a hydrocarbon, $C_{10}H_{16}$, to which the name "cynen" has been given, characterized by its readiness to form a tetrabrom compound.

It is known that essential oils are mostly mixtures of hydrocarbons of the terpene group and compounds containing oxygen, approximating to camphors, and a multitude of names have been given to these compounds according to the source from which they are derived. Herr Wallach has commenced an investi-

gation with the view to ascertain whether some of these differently named constituents are not identical with each other. As a first step he reports (*Annalen*, ccxxv., 314) that cajeputol, the principal constituent of oil of cajeput, is identical with cyneol, the principal constituent of wormseed oil, mentioned in the preceding paragraph. As cynen, the terpene obtained from cyneol, possesses an odour of lemons, some experiments were also made as to its relationship towards the terpenes of oils from aurantiaceous plants. Oleum citri treated with bromine yielded a small quantity of a crystalline tetrabromide. Oleum corticis aurantiorum, which consisted mainly of the terpene hesperiden, yielded a tetrabromide more abundantly, closely resembling cynen tetrabromide, but having a lower melting point. Herr Wallach, therefore, concludes that there is probably a near chemical relationship between hesperiden and cynen, though not identity.

Safrol is the principal constituent of the essential oil of *Sassafras officinalis*, from which it crystallizes, on cooling the fraction boiling between 228° and 235° C. to −25° C., as a colourless, transparent, strongly refractive optically inactive mass, melting at 8° C., boiling at 232° C., and having the composition $C_{10}H_{10}O_2$. According to Dr. Poleck (*Chem. Zeit.*, Oct. 9, p. 1453) it is an extremely stable compound, the oxygen not being contained in the molecule as hydroxyl, but in much closer combination, all his attempts at its reduction being unsuccessful. In the behaviour of safrol towards reagents it presents no analogies with alcohols, ethers, phenols, quinones or other classes of organic compounds. Dr. Poleck considers that it is probably a methylpropylbenzol, or cymol, in which four atoms of hydrogen of the benzol are substituted by two atoms of oxygen.

Jalapin, the glucoside of *Ipomœa orizabensis*, has been investigated by Dr. Samuelson in Dr. Poleck's laboratory in Breslau University (*Chem. Zeit.*, Oct. 9, p. 1543). It is represented by the formula $C_{34}H_{56}O_{16}$, being the anhydride of jalapic acid, and when boiled with baryta water it splits up into two molecules of jalapic acid, forming the barium salt. Dilute hydrochloric acid splits jalapin up into grape sugar and jalapinol ($C_{16}H_{30}O_3 + \frac{1}{2}H_2O$), possessing all the properties of an aldehyd. Jalapinol when decomposed by alcoholic potash, yields jalapinolic acid ($C_{16}H_{30}O_4$), isobutyl alcohol and a neutral resin, probably a polymer of jalapinol. Both jalapinolic acid and jalapinol are oxidized by potassium permanganate to isobutyric acid. Jalapinol would, from these and other considerations, appear to be tetrabutylaldehyd.

A newly observed constituent of Siam benzoin is the subject of an interesting preliminary communication from Herr Hirchsohn (*Pharm. Zeit. f. Russl.*, xxiii., 601). Upon shaking finely pulverized Siam resin with about ten times its weight of carbon bisulphide and allowing the mixture to stand, it separated in twenty-four hours into two layers, the upper one thick and containing insoluble resin, the lower one a clear yellow solution. This solution was removed by means of a siphon, filtered, three-fourths of the carbon bisulphide distilled and the remainder left in a cool place. After a few days colourless, warty crystals separated that had a distinct vanilla odour and formed neutral solutions with carbon bisulphide, ether, benzol, chloroform and 95 per cent. alcohol. The alcoholic solution, upon being boiled assumed a yellowish-green colour and then showed an acid reaction. The crystals were insoluble in water, but upon boiling them in water they melted to an oily mass, the liquor then having an acid reaction, which gradually became more intense, and eventually yielding fresh crystals that may have consisted of benzoic acid. Concentrated sulphuric acid dissolved the original crystals with a beautiful red colour, and by shaking the acid solution with ether and evaporating, a crystalline body was obtained showing all the characters of benzoic acid. A smaller proportion of tabular crystals was obtained by a similar treatment of Sumatra benzoin.

In the Physiological Section of the late International Medical Congress, at Copenhagen, Professor Haycraft announced that he had observed in the sucker and gullet of the leech a secretion possessing the property of staying the action of the ferment to which the coagulation of blood is due without destroying the corpuscle (*Lancet*, Oct. 11, p. 659). This secretion, he says, may be extracted by first dehydrating the leech by means of alcohol and then treating the anterior part with water. When injected into the veins of dogs or rabbits the secretion induces a condition resembling hæmorrhagic diathesis, blood drawn subsequently from the animals remaining fluid and the smallest wound bleeding continously. This would sufficiently explain the difficulty sometimes experienced in stopping bleeding from a leech-bite. It is suggested that in cases of transfusion of blood, danger of clotting might be avoided by previous injection of the secretion into the person who is to be bled; but it would seem desirable, both in the interest of the person yielding the blood and the one receiving it, first to have some experience as to the time during which the anti-coagulating effect would be prolonged.

In a communication to the *Lancet* (Oct. 4, p. 608) it is stated that Dr. Koller, of the Vienna General Hospital, has found cocaine to be a valuable agent for the production of local anæsthesia, as, for instance, in ophthalmic operations. One to three drops of a 2 per cent. watery solution of cocaine (*sic*) introduced into the corneal chamber is said to have rendered both the conjunctiva and cornea completely insensitive, so that the cornea could be partially gouged without exciting any reflex action or sense of pain. The value of such an agent in the removal of foreign bodies from the cornea and in more serious operations is obvious. It may be remarked that although in the communication referred to the alkaloid is said to have been used, a circular issued by Herr Merck claims that the results were obtained with a "soluble muriate of cocaine."

Some time since Dr. Müllenhoff arrived at the conclusion that in sealing honey cells bees add formic acid to the honey by thrusting the abdomen with the sting protruding and a minute drop of poison adhering into the half-closed cell. The honey taken from sealed cells is said to be much more stable than that taken from unsealed cells, and Dr. Müllenhoff attributed this to a difference in respect to its contents in formic acid, which is known to be a powerful antiferment. He, therefore, treated 100 grams of unsealed honey with 0·1 gram of formic acid, and preserved it and the same quantity to which no acid had been added under similar conditions; after a time it was found that the first sample remained unaltered, whilst the second was undergoing fermentation. He, therefore, proposes to make a technical application of this ob-

servation by adding the formic acid to the unsealed honey and thus sparing the bees the time and labour involved in sealing the cells. Dr. Müllenhoff states that one part of 25 per cent. acid is sufficient for 250 parts of honey.

In a communication to the Academy of Sciences (*Comptes Rendus*, xcix., 509) on the antiseptic properties of carbon bisulphide, M. Ckiandi Bey points out that, contrary to the statements generally found in works on chemistry, it is soluble in water at a temperature of 64° to 68° F. (18° to 20° C.), to the extent of 2 to 3 parts per 1000. This solution arrests all fermentation, kills microbes, and is a most energetic antiseptic; it also has considerable penetrating power. When the solution is taken internally it produces a hot and sweet taste in the mouth, then a sensation of heat in the stomach and pricking of the mucous membrane of the nose, similar to that caused by sulphurous acid, and slight dulness in the head, which, however, is not lasting. For these reasons the author recommends its use in cholera and all zymotic diseases, typhus, diphtheria, phthisis, etc. It has already been experimented with by Dr. Dujardin Beaumetz, who found that in case of typhus the diarrhœa was arrested, the stools disinfected and the breath rendered sweet. As the cost of the solution is extremely small, M. Ckiandi Bey suggests that it might be used for watering the streets and cleansing houses, etc. For medicinal use it is necessary that the sulphide should be purified by agitation with metallic mercury until it no longer gives a black precipitate. It then has an odour which recalls that of chloroform. The solution can be made by energetically shaking the sulphide with water. Externally applied to the skin by means of a wad of cotton it proves a most energetic revulsive, producing a pain like that by scalding with boiling water, which immediately ceases when air is blown upon the skin, so as to vaporize the sulphide remaining on it. An alcoholic solution slowly decomposes, giving rise to sulphuretted hydrogen and other compounds.

A new therapeutic value has been discovered in pellitory root by Dr. Roth. Knowing that the drug has been found useful in paralysis of the tongue and pharynx, he was led to try it in the treatment of globus hystericus, which he regards as due to paræsthesia of the sympathetic. In six cases in which he used it satisfactory results followed. The dose he gave was ten to twenty drops four times a day (*Practitioner*, p. 286). In a case which came under the notice of the writer, smoking a cigarette gave immediate relief on several occasions in which it was tried.

A decoction of lemon is reported by Dr. Aitken, of Rome (*Brit. Med. Journ.*, Oct. 4, p. 653) to be a very valuable remedy in the treatment of ague. A dose is prepared by cutting a freshly gathered and unpeeled lemon into thin slices, adding three teacupfuls of water, boiling until reduced to one teacupful, and allowing the decoction to stand all night in the open air, when after being separated by filtering and pressing from the rind, pulp and seeds, it is ready for administration, and should be given at once, first thing in the morning. Dr. Aitken says it has never seemed necessary to give more than one such dose daily. Although the method of preparation is somewhat crude, this may be condoned in consideration of the results reported to have been obtained. Dr. Aitken's speculations have failed to identify the active principle to which the antipyretic action is due, though he is sanguine that it will soon be extracted and come into general use; but he remarks that "the alkaloidal principles, hesperidine and limonine, said to be obtained from lemons, are quite unknown to medicine," and, it may be added, to chemistry too.

According to the *Medical Press* (October 15, p. 341) naphthaline has been used with success by Professor Rossbach during the last three years in all cases of diarrhœa that have come under his care. In cases of chronic intestinal catarrh attended with chronic diarrhœa, favourable results were obtained in from five to fifteen days. In cystitis, pus, blood and vibriones disappear quickly after its administration. It was given in doses of 2 to 3 grains per day. After ½ grain daily the appetite was often improved.

A writer in the *Medical Press* (October 1, p. 292) gives a formula for a mixture for the cure of piles, from which he has, in his own experience, found great benefit, and which, for the benefit of those who do not see that journal and who may be asked for the mixture, is reproduced here:—Potass. bromid., ℥ij.; ext. ergotæ liq., ℥ijss.; tr. nucis vom., ℥j.; sp. am. arom., ℥jss.; aq., ad ℥viij. M. Sign. ℥j. four times a day.

Dr. S. W. Smith, of Pershore, speaks, in the *British Medical Journal* (October 11, p. 711), very highly of the value of willow charcoal in diarrhœa, stating that ordinary powdered charcoal as obtained from druggists failed to produce the same effect. He apparently attributes the good results obtained to the presence of salicin; but it would be curious to find that salicin remains in willow wood after combustion.

It is often remarked by some persons that they cannot swallow a pill. This arises probably in many cases from the mode of swallowing adopted. Dr. S. E. Wills, of Maryland, remarks that if pills be swallowed in the same way that food is, with the head inclined forward, the chin near the breast, and if a small quantity of water be taken after the pill is put into the mouth, it will be surprising how easily the pill can be swallowed. The usual plan of throwing the head back when taking a pill renders it much more difficult to swallow (*Practitioner*, p. 297).

"Chill" October can hardly be said to be an appropriate designation for the past month, inasmuch as the majority of days have been mild and warm. A few days of cold wind during the last week have, however, made evident the fact that the "fall" of the year is upon us. In London, the leaves are drifting along the streets in myriads, and in the country the autumnal tints are already beautifying the copses and forests. The red berries of the *Dulcamara*, of the white and the black bryony, and the lovely pink fruits of the spindle tree are giving a touch of brightness to the otherwise dingy hue of the hedgerows. Fruits rather than flowers must now become the objects of interest for botanical students, although there are several groups of plants that are more easily studied at this time of year than any other. Thus the *Euphorbiaceæ*, *Polygonaceæ*, *Plumbaginaceæ* and *Chenopodiaceæ* afford many species that will repay careful examination. Several of the *Convolvulaceæ* also are still in blossom, and a few of the *Gentianaceæ* now afford instances of the marcescent corolla; the fruit also is in good condition for examination. During the past month,

a correspondent at Bournemouth has forwarded fresh specimens, in flower, of the pretty Calathian violet, *Gentiana Pneumonanthe*, and *Droseras* in fruit. Several other rare British plants may also be now found in good condition, among which may be mentioned *Chrysocoma Linosyris*, *Suaeda fruticosa*, *Obione pedunculata*, *Artemisia campestris*, etc. In gardens, the curious accrescent calyx of *Physalis Alkekengi* forms a conspicuous object. This plant, according to the Rev. C. Woolley Dodd (*Garden*, Oct. 4, 293), derives it sname alkekengi from the Arabic, and other plants bearing names having a similar origin are mentioned by him, as Ceterach, Sumach and Cheiranthus Cheiri. He quotes Gerarde's 'Herbal,' ed. 1597, p. 371, to prove that the wallflower is called "in the Arabic toong Keyri," and Parkinson's 'Paradisus' ed. 1629, p. 256, to prove that "the plant is called Keiri or Cheiri, by which name it is chiefly known in our apothecaries' shops, because there is an oyle made thereof called cheirinum." Linnæus, in his 'Materia Medica,' 1749, describes its properties as "anodyna, nervina, pellens, uterina," and mentions its use in "dolor" and apoplexia. Johannes Franckenius, writing about 1640, describes it as emmenagogue and the distilled water as being valuable for removing spots from the eyes.

The *Gardeners' Chronicle* (Oct. 4, p. 42) gives an illustration of the fruit of *Garrya elliptica*, which has rarely been seen in Britain, from a specimen grown at Llandudno. The berries, which are about the size of large peas and are arranged in five or six dense clustered spikes, have a brittle shell containing a dark blood-red juicy pulp. Botanists have been somewhat doubtful about the alliance of the genus, but in Bentham's 'Genera Plantarum' it is placed in the *Cornaceæ*. The leaves are intensely bitter, and a careful chemical examination might possibly, as in the case of *Duboisia*, throw some light upon its affinity.

At the recent Fungus Foray of the Hackney Natural History Society, at Epping, on September 27, two edible fungi new to the British Flora were discovered, viz., *Hydnum diversidens*, Fr., and *Boletus duriusculus*, Katch. (*Gardeners' Chron.*, Oct. 11, p. 466). Several species new to Britain were also found in the Epping Forest Foray by members of the Essex Field Club.

The *Journal of Botany*, this month, gives an illustration of a new British plant, *Naias graminea*, Del., with a very complete account, by Mr. C. Bailey, of the discovery of the plant in Britain, of its synonymy, histological structure and morphology, the whole occupying fifteen pages.

The pretty blue flowers of the borage may still be seen in blossom in waste places near old towns. This plant is remarkable for the quantity of nitrate of potassium which it contains, and for having formed in olden times a drink known as "cool tankard." On account of the quantity of nitrate it contains, it is one of the plants that have been recently examined by MM. Berthelot and Andre (*Comptes Rendus*, xcix., p. 550) with a view to discover the variation in the amount of nitrate present during the different stages of growth of the plant. According to their investigations the seed contains an appreciable quantity of potassium nitrate and the proportion increases during the growth of the plant, reaching its maximum with the development of the inflorescence and diminishing as the reproductive process develops, but after it is over, again increasing so that the total amount present in the plant may be greater than before inflorescence, although the relative amount in proportion to the weight of the plant may be less. It was found that if the inflorescence was systematically removed, the plants became tufted and vigorous, but the nitrates almost entirely disappeared. The amount of nitrates present in the yellowish or withered leaves taken from a living plant and dried in the air seemed to differ but little from that found in healthy leaves; but if the whole plant were taken up and dried and then examined, the nitrates were found to have apparently accumulated in the leaves owing probably to the larger surface for evaporation from them than from the stem. This seems to indicate that in drying medicinal plants for the sake of the leaves, the best plan would be to dry the whole plant and pick off the leaves as they become dry, provided that the alkaloids follow the same course, viz., from the stem to the leaves, during the drying process, a point which, however, needs to be ascertained by direct experiment.

M. Ballo (*Journ. Roy. Microsc. Soc.*, October, p. 678) considers that one of the reasons why nitrates are so valuable to the growing plant is that they are decomposed by formic acid, giving rise to the formation of oxalic acid, a portion of which, in its turn, is used in the decomposition of sulphate of calcium, and the rest for the production of glycolic, malic, tartaric, succinic and other acids; another portion of the nitrates is used in the production of ammonia and allied compounds, and a third in the conversion of amide compounds into alcohol compounds. The nitrates serve as carriers of oxygen; hence a small quantity of nitrates can bring about the formation of a large quantity of oxalates. He believes the oxalic acid to play a much more important part in vegetable physiology than is generally supposed, the carbohydrates being formed from the reduction of this or other vegetable acids rather than by direct synthesis from carbonic acid and water.

The relative proportion of acid in different plants and in different parts of the same plants has been investigated by G. Kraus (*Bot. Centralb.*, xviii., p. 100). He finds that the acidity increases from above downwards, and that its formation is as a rule hindered by light, the maximum of free acid being found in the early morning and decreasing to a minimum in the evening, increasing again gradually during the night. He considers that the acids play an important part in the processes of plant life and as secondary products of respiration. The acid most abundant in the sap is malic, either free or in the form of malate of calcium, the amount present remaining constant by day and night.

An interesting *résumé* of the theories which have been offered to explain the ascent of water in plants is given in *Nature* (Oct. 9, p. 562), including a notice of the recent theory promulgated by Elfving, for which the name of the "step" theory is suggested. This experimentalist had previously shown that the water is not carried by means of the cell walls, since when the cavities of the cells and vessels were stopped up, and their edges only exposed no water could be pressed through a piece of wood. He also showed that in coniferous wood coloured solutions pass into the cavities of the wood-cells through the thin membranes of the bordered pits and not, so far as could be ascertained, through

the thickened portion of the walls. It has been shown by others that when pressure is exerted on an alternate series of bubbles of air and columns of water in capillary tubes, each successive column of water receives less pressure, and therefore external or root pressure could not account for the rising of the column of water in trees of great height. According to Elfving the lateral ascent of fluid through the walls of one cell to another does away with the necessity for supposing that columns of water have to be suspended and moved on, since the molecules of water can pass in a lateral direction between the supporting bubbles of air as if they had no weight, the individual particles of water having perfect freedom of motion and travelling towards the transpiration surfaces.

CORROSIVE SUBLIMATE AS A SURGICAL DRESSING.*

BY SIR JOSEPH LISTER, BART, F.R.S.

When, in an address delivered at the opening meeting of last session, I expressed myself in what some of my hearers regarded as terms of overweening confidence in the trustworthiness of antiseptic treatment, I little thought that, a year later, I should have to tell you of failures on my own part; yet such is the case. Several instances have occurred, within the last few weeks, of results deviating from our typical experience in antiseptic treatment, such as I was in no way prepared to meet with, and in one case a fatal event ensued. A lady, on whom I operated for scirrhus of the mamma, with removal of the axillary glands, died of a spurious pyæmia, or a variety of septicæmia, an occurrence such as I have not met with for many years past. We dressed the wound in the usual way. Two days after the operation there was pus already present at the anterior part of the incision. There happened to have been an unusual flow of blood at this part, where we do not as a rule expect much. It is a very unusual thing for pus to appear so early. We used to say, in what I may term the pre-antiseptic days, that, if we operated upon sound tissues, suppuration occurred, provided primary union did not take place, in from three to four days, three days in children, four days in adults, and, perhaps, in warm weather, rather earlier than four days. For pus to occur to the amount of several drachms at the end of two days was therefore very unusual, and some special form of organism, I have no doubt, was present. Micrococci were indeed found after death in abscesses which had formed within the pleura. Nevertheless, though I believe some unusual organism was present, we have been accustomed to consider ourselves free from the apprehension of such ill effects; and though no other fatal case occurred, I am thankful to say, there have been several instances of deviation from the typical course, where, instead of union without suppuration at all, we have had healing retarded by the formation of more or less pus, undoubtedly of a septic character—in the sense in which we now use the term septic—that is to say, dependent upon the development of micro-organisms, although no smell was perceptible. I need hardly say that one such result as that to which I have referred, a fatal event under circumstances which we have been accustomed to consider absolutely free from danger, made me reflect most seriously; and the other cases, though less disastrous, were also grave cause for reflection.

In looking for the source of our misfortunes, it was to the external dressing that we naturally turned our attention. The experiences of Mr. Cheyne and Professor Ogston indicate pretty distinctly that the means which we ordinarily use are sufficient for the purpose of rendering our wounds free from mischievous micro-organisms at the time we put on our dressings. Both Mr. Cheyne and Professor Ogston have found, by using the most advanced methods of investigation, that if a carbolic acid gauze dressing is changed daily, no organisms are met with in the discharges. That, I say, seems pretty conclusive evidence that the means which we have adopted hitherto for the purpose of keeping our wounds pure, up to the time when the dressings are applied, are sufficient. With regard to our external dressings, our suspicions tended to turn upon the eucalyptus gauze. Eucalyptus oil is undoubtedly a powerful antiseptic, and I have been using it in the form of gauze for a considerable time past. One difficulty with it is its great volatility. In the first instance I employed gum dammar instead of common resin, in the manufacture of the gauze, because I found that gum dammar held the eucalyptus oil more securely than the resin does; but gum dammar is an expensive gum, and, after some trials with common resin, I thought I was justified in substituting the cheaper material, and for a while we seemed to get good results with this arrangement. But, as I have already said, more recently the results were not satisfactory. I mean that, now and again, a case occurred which was unsatisfactory. On making inquiry of the manufacturer of our eucalyptus gauze, I found that he had deviated from the instructions which he had received as to the manufacture; that he often left the gauze, for a considerable time after it had been charged, exposed in the air before folding it up, thus affording opportunity for the escape of the volatile constituent in large amount; and in hot weather, such as that during our recent summer, this was more especially apt to occur. We found, as a matter of fact, that the eucalyptus gauze supplied to us had not the softness which it ought to have, caused by the adequate amount of eucalyptus oil. I was thus led to attribute our disasters to imperfection in the manufacture of the eucalyptus gauze.

These circumstances led to a reconsideration of the subject and to an appreciation afresh of the disadvantages of any volatile antiseptic substance. Volatile antiseptics have their own advantages, to which I need not refer, but they have great disadvantages. In the first place, we are at the mercy of our manufacturer. The resin and paraffin so glue the folds of the gauze together, if it is allowed to cool in mass, that it must be opened up while warm, and upon the way in which this is done by the manufacturer much depends as to the quantity of the antiseptic present in the gauze. In the next place a volatile antiseptic, such as either carbolic acid or eucalyptus, has the disadvantage that it requires careful treatment by the surgeon himself. The material containing it must be kept in well-closed metallic vessels; otherwise evaporation soon impairs its qualities. And, in the third place, there is this disadvantage attending all volatile antiseptics, that the longer the dressing is kept upon the body the less efficacious does it become; and who is to say when the time arrives when it has become so inefficacious that it is necessary to remove it? I have been accustomed to regard a week as the limit of the time during which a carbolic acid gauze dressing may be regarded as effectual; but beyond the fact that, with this period, our results were, on the whole, satisfactory, we had no precise grounds to go upon. In that respect a volatile antiseptic must always be at a disadvantage, as compared with a non-volatile one, which will be just as efficacious at the end of a month, or six weeks, as it is when first applied, provided it is not soaked with the discharge.

Salicylic acid is a non-volatile antiseptic; but salicylic acid, as I ascertained from experiments several years ago, is very far from being as powerful in antiseptic qualities as carbolic acid, and therefore I have never ventured to use it for serious cases. Iodoform, while volatile, is very slowly volatile, and, at the same time, so little soluble in the discharges, that in these points of view it

* Address delivered at the opening meeting of the Medical Society of London, October 20, 1884.

seems an admirable antiseptic; but iodoform is by no means a potent agent in its action on micro-organisms. I ascertained some years ago, for example, that, taking a 10 per cent. iodoform wool, the strongest used, and soaking this with milk, the lactic fermentation was only a short time retarded, and in the course of a few days, not only the *bacterium lactis*, but multitudes of other kinds of bacteria were seen, in abundance, in the milk. Again, uncontaminated urine being made to soak such a piece of wool, and then inoculated with putrefying urine, I found that the ammoniacal fermentation was only a short time retarded by the iodoform. Hence I was not surprised to learn that in the practice of Schede of Hamburgh, and others, it had been found that erysipelas occurred under the iodoform dressings. It is remarkable that iodoform has such an effect as it has in preventing putrefaction, but it is by no means a powerful germicide.

But there is another non-volatile antiseptic, corrosive sublimate, to which attention has been more especially directed of late years by Dr. Koch; and here I may be permitted to give my tribute of praise to the admirably conceived and conclusive experiments which he has performed upon this subject. Koch proceeds in this sort of way: he dips a very small piece of silk thread into a fluid containing the spores of the bacillus anthracis, known to be highly resisting to the various agencies inimical to low organisms. After this silk thread has become dry he dips it in the antiseptic solution to be tested, keeping it there for a minute, half a minute, five minutes, or any length of time that is required. He then, by means of water or alcohol, or some fluid known not to influence the vitality of the spores, washes away the antiseptic from the thread, and brings into play his beautiful method of solid culture-material. He places the little bit of silk thread upon a piece of gelatine properly provided with nutritious material, and of course scrupulously pure, and observes, by means of the microscope, whether the spores in the silk thread develop or not. He ascertained by experiments of this character that a solution of only 1 part of corrosive sublimate in 20,000 parts of water was amply adequate absolutely to destroy the vitality of the spores of the bacillus anthracis, about the most resisting spores that are known. But he found also that as weak a solution as 1 of the sublimate to 300,000 parts of a solution of extract of meat was sufficient to prevent the development of the spores so long as they remained in it; but when the silk thread, having been for any length of time in this exceedingly weak solution, was withdrawn from it, washed, and then placed upon the nutritious gelatine, development occurred as if the spores had not been exposed at all to any injurious agency; and thus Koch established in a most definite manner the distinction, and a very important one it is, between two different effects of antiseptic agents—one, the action by which the vitality of organisms is destroyed; and the other, that by which development is simply arrested, or prevented temporarily from occurring, without the vitality of the spores being interfered with. The former we may term "germicidal action." For the latter, it is somewhat difficult to find a good English term. I happened, I believe, to be the first to use the word "inhibitory" in English physiology, by the advice of my old friend, Dr. Sharpey, with reference to an early paper I was about to publish on what the Germans term the Hemmungs Nerven-System; and as this same word Hemmung is used by the Germans for this checking or suspending action of antiseptics, without destruction of vitality, and as it is very important that we should have some term which distinguishes the one action from the other, I may venture to employ this same word "inhibitory"—a good old English word—for this action of antiseptics, and to speak of their "inhibitory action" as distinguished from their "germicidal action."

Now, these properties of corrosive sublimate were such as no other antiseptic agent has ever been ascertained to possess in anything like such dilute solutions. With regard to our purposes in antiseptic surgery, the inhibitory action of the antiseptic would be sufficient, provided we were satisfied that our wound is left free from injurious organisms, and that the dressing which we apply, itself contains no such organisms still alive. Then, all we require is that the dressing should be able to prevent the development of organisms from without into the discharges with which the dressing may be soaked. That is obvious.

Corrosive sublimate has been used extensively already by our German brethren, chiefly in the form of sublimate wood-wool, as it is called, in which ½ per cent. of corrosive sublimate, with an equal part of glycerine, is mixed with what is termed "wood-wool"—namely, pinewood reduced almost to a state of powder by suitable machinery. This is highly absorbent. It is employed in large masses, and, so used, has given many excellent results. At the same time, it is somewhat unwieldy in its application. Under certain circumstances it is not convenient to have so large a mass as is essential for its safety, and we have also varying reports as to its efficacy; and I may remark that we find some surgeons satisfied with what others would regard as a very mediocre kind of success with antiseptic treatment.

The circumstances to which I referred at the beginning of this address naturally made me turn my attention to corrosive sublimate; and I was desirous, if possible, to use it in a more concentrated form, so that it might be employed in a less bulky fashion; accordingly I prepared a gauze containing, instead of ½ per cent., 1 per cent. of the sublimate.

The first case in which I used it was that of an elderly lady, from whom I removed the mamma and cleared out the axillary glands. I put immediately over the wound a piece of prepared oiled silk, which I dipped in a 1 to 500 solution of corrosive sublimate; then, over this, sublimate gauze, and outside all an abundant eucalyptus dressing. On the following day, when we changed the dressing, I found that, under the oiled silk, exactly corresponding to its extent, the skin was highly irritated, and was covered with small vesicles. I also found that the inner side of the arm, where there was no wound, was in the same state of intense irritation. I covered the irritated parts of the inner side of the arm with eucalyptus gauze, dipped in a weak solution of carbolic acid, and I applied to the wound the 1 per cent. sublimate gauze without any intervening protective oiled silk. On the following day I found that the little vesicular pustules, which had formed on the first day under the protective, had healed, and that the inner side of the arm also had recovered from its irritation. How were these facts to be explained? I believe the explanation to be this. The 1 to 500 watery solution of corrosive sublimate, prevented by the oiled silk from escaping, had acted as a powerful irritant upon the skin; but when the 1 per cent. gauze was applied directly to the wound, the oozing of the albuminous discharge from the pustules and from the edges of the wound mitigated the action of the corrosive sublimate, and so prevented further irritation there. Again, in the case of the arm, what had occurred was, free perspiration had taken place, and the perspiration forming, with the corrosive sublimate in the gauze, a watery solution, had produced irritation where the perspiration was, on the same principle as the watery solution had caused irritation under the protective.

I continued to use a corrosive sublimate dressing in this case. It so happened that there was a very free hæmorrhage after the operation. I never before saw small vessels so atheromatous. We had to tie multitudes of little rigid arteries, and, in spite of this, a considerable effusion of blood took place, and bagged under the skin. She left town with the outer angle of the wound still unhealed, and having the remains of the blood-clot exposed in it; the dressing employed being a piece of absorbent cotton-wool charged with about 5 per cent. of sublimate, secured in its place with collodion, and she

came every few days to London to have the dressing changed. On these occasions I found that although the serous discharge had soaked the wool more or less, there was no irritation caused by it; and the blood-clot, in course of time, presented an appearance which I never happen to have seen before. From the epidermic edges of the little wound the epidermis crept over the surface of the blood-clot like the white claws of an animal extending over the dark coagulum. We are familiar with the organization of the coagulum in exposed wounds, and we are also familiar with the fact that in the course of time the superficial clot may be removed, and a scar found under it, without any suppuration having taken place, or any granulation, strictly speaking; but I never happened to have seen before this formation of epidermis extending over the surface of an exposed coagulum; and the explanation I believe to be that, while a sublimate wool rendered the wound for surgical purposes perfectly aseptic, the albuminous discharge from the wound prevented the sublimate from coming into operation as an irritant, and so we had, in a peculiarly perfect manner, complied with the essential conditions for the treatment of superficial sores—namely, the exclusion on the one hand of septic agency, and on the other of the irritating property of our dressing. I may add that the wound healed without a particle of pus having been formed from first to last.

While this case showed that in the sublimate we had an agent that might give very beautiful results, it also indicated that we were dealing with an edged tool, which, while it might do admirable work, was very apt also to cut our fingers; and the question suggested itself, Was it, after all, possible to use corrosive sublimate in such a way as to get the advantages without the disadvantages? The question, for instance, suggested itself, Suppose the discharge had been more considerable in this case, so as to soak thoroughly through and through the dressings, what might then have been the result? What is the action of the albumen of serum or blood upon corrosive sublimate? How do they act upon each other? It is, I believe, a very general view in the profession, not to say among professed chemists, that albumen forms, with corrosive sublimate, an insoluble, or very sparingly soluble, albuminate; and that this albuminate is inert; whence the efficacy of white of egg as an antidote in corrosive sublimate poisoning. In the fourth edition of Miller's 'Chemistry' it is distinctly stated that an albuminate of mercury is formed as a precipitate when a solution of albumen is treated with corrosive sublimate. In the third appendix to Watts's 'Dictionary of Chemistry' the albuminates are still spoken of, and, in the intermediate appendices, there is nothing said to interfere with the view expressed in the original work—viz., "Mercuric albuminate is a white substance obtained by precipitating corrosive sublimate with albuminate of sodium (white of egg)." If it were really true that the albumen, acting in a certain proportion on the corrosive sublimate, would form with it an absolutely inactive compound, this would be a very serious consideration for the use of corrosive sublimate in surgical practice. The albuminous (proteid) constituents of the blood are enormously abundant; while the quantity of corrosive sublimate we can use in our dressings cannot be very great. According to the most recent views regarding albumen, its chemical equivalent is about six times that of corrosive sublimate; but the quantity of albuminous material in the serum of the blood is very much more than this in proportion to any amount of sublimate that we could have in our dressings. My first experiment upon this matter was as follows. I made a solution of albumen from white of egg, and then introduced it into some sublimate-wool, the quantity of albumen used being double that which would be requisite to neutralize the corrosive sublimate, according to the view to which I have referred. After leaving the albuminous fluid in the wool for a certain time, I squeezed the wool, and obtained a clear fluid, and I was surprised to find that this clear fluid tasted strongly of corrosive sublimate; an albuminous fluid containing twice the quantity of albumen that was essential, according to the views to which I have referred, for neutralizing the corrosive sublimate, had picked up from the wool corrosive sublimate enough to give the fluid that came out a strong taste of that substance. I mixed this liquid with an equal part of milk obtained from a dairy, and the milk remained perfectly free from souring, showing that the albuminous fluid which had come through the wool had antiseptic qualities, as well as the taste of corrosive sublimate.

I afterwards made other experiments with blood itself, and that to which I will now refer was with the serum of horse's blood. My first attempt to obtain serum from horse's blood failed. I wished to get the blood in an aseptic state, so far as one conveniently could without going too much into detail; and I used a glass jar which I had had by me for a long time past, and which had been used for experiments with regard to catgut, and had certain impurities adhering to it which could not be cleaned off. I purified this with 1 to 500 solution of corrosive sublimate, and then introduced into a horse's jugular vein a glass tube purified in the same way, and through this tube drew blood into the jar and allowed it to coagulate, intending to use the serum which should ooze out of the clot as it contracted. I was baffled, however, by finding myself again in presence of a fact which I described some years ago, where antiseptic precautions had been used in obtaining blood; the clot never contracted.

When I first witnessed this fact, having found the novel procedure of antiseptic precautions in taking blood followed by the novel phenomenon of failure of the clot to contract, I was disposed to attribute the one to the other, and to imagine that the destruction of the septic organisms was in some way or other the cause of the absence of the shrinking. Then it was suggested to me that Liebig had shown, in his 'Letters on Chemistry,' that if glasses are heated they lose for a time their usual property of causing certain phenomena of crystallization; and, as my glasses had been always purified by heat, there might be some peculiar physical property in the glass to account for the circumstance. But here we find the same phenomenon cropping up, although the glass had not been purified by heat, and although it had not even a clean smooth surface.

It may be interesting to you to observe that, though the antiseptic precautions used were but of a rough kind, still no genuine putrefaction has occurred, in spite of the hot weather, in this blood taken on September 9; but the remarkable fact to which I wish to direct your attention is that, while the buffy coat peculiar to horse's blood can still be recognized, it has entirely failed to contract, and is to be seen adhering to the surface of the vessel. I must confess it seems to me barely conceivable that the development of organisms can be the cause of the contraction of the clot under ordinary circumstances, considering how soon that contraction begins to come into play. Yet to what else are we to attribute it? It is to me, I confess, a perfect mystery. At the same time, to us surgeons it must be admitted to be highly interesting, because in antiseptic surgery, at all events, this is the very condition of things in which we find the clot. We do not find a clot shrink away, or tend to do so, from the sides of the wound, but it retains its original bulk until it is gradually diminished by absorption and organization; and if a clot forms in the vicinity of a ligature upon a large artery, it seems very important that it should not shrink away from the sides of the vessel, but remain there in its original dimensions to serve its purpose of a plug.

On the same occasion on which I obtained this blood, I received a portion into another vessel, and stirred it during coagulation so as to remove the fibrin. This

whipped blood answered my purpose perfectly, because by virtue of the remarkable tendency that the red corpuscles of the horse's blood have to aggregate into dense masses, and so fall rapidly in the course of a short time, the mixture of serum and red corpuscles was found in three hours to consist of about one-half corpuscles and one-half serum, and therefore I could use the serum for the purpose of my experiment.

The experiment was performed in the following manner. A glass tube such as this (three-quarters of an inch in calibre and three inches in length), open at each end, was packed with a certain weight of antiseptic dressing to be tested, say sublimate-wool, occupying about two inches of the tube; then a weighed quantity of serum, just enough to soak the wool, was poured in at one end of the tube held vertically; it was then left for about half an hour in a warm box, at the temperature of the body, after being put into a stoppered bottle to prevent evaporation; then the serum and the sublimate in the dressing having been allowed to act upon each other for about half an hour, a little more serum was poured in, the tube being in the same position as before. The result was that a certain quantity flowed out below, and was received into a test-tube. The lower part of the wool and the serum in the test-tube were next inoculated with putrid blood, diluted with ten parts of water, to prevent the smell being so great as to make you think that putrefaction existed when none had occurred, a tenth of a minim being applied by means of a suitable apparatus. Lastly, the wool-tube, in its stoppered bottle, and the test-tube with a cap of thin mackintosh tied over its mouth, were replaced in the warm box. The object of this was to ascertain whether the dressing, after having been thoroughly soaked through and through with serum, would resist a potent septic inoculation; and also whether the fluid that had come through the dressing was itself an antiseptic fluid. If such should prove to be the case, we should have all the requisites we could desire for an antiseptic dressing. It was a very severe test, for it is comparatively rarely that we have such intensely putrefying substances applied to the surface of our surgical dressings, and it is also comparatively rarely that the dressings are soaked so very thoroughly with blood or serum.

I used three kinds of sublimate-wool, one containing 1 per cent.—twice as much as there is in the wood-wool—one 5 per cent., and the other 10 per cent. I have mentioned that it was on September 9 that this was done, and all these three wools remain perfectly pure, so far as the sense of smell can detect, to the present time. The bottles are before you, and even in that containing the 1 per cent. wool you will find nothing but a smell something between mortar and the inner bark of some trees, which is the immediate effect of the action of corrosive sublimate upon the serum. The serum that had come through the dressing equally resisted the inoculation. By means of a process of testing with which I will not now trouble the Society, I could ascertain pretty exactly the proportion of corrosive sublimate present in these liquids that had thus come through. The corrosive sublimate made the liquids turbid in the case of the wool with stronger proportions; but in the case of the 1 per cent. it had not rendered the serum turbid, and therefore I was able, without the use of the microscope, to judge by the existing transparency, and also by the presence or absence of scum on the surface, whether any organisms did or did not develop; and none whatever occurred. As regards the strongest wool, the liquid which came through contained about 1 part of corrosive sublimate to 160 parts of the fluid. I tasted this, and found it had the peculiar metallic nauseous taste of corrosive sublimate. I also mixed some of it with 5 parts of milk got from a dairy, and, therefore, as we know, teeming with bacteria of various kinds. Here is the milk, still fluid after the lapse of nearly six weeks, although when it was mixed with the serum it was already advancing towards septic changes. The first of those changes—namely, lactic fermentation—has been prevented, otherwise the milk would not have been fluid, as you see it to be. There is not the slightest smell either of the lactic or butyric fermentation, but only that which Pasteur pointed out to occur as the result of oxidation of the fatty matter of milk—a little odour of suet. That is exactly the smell that you have in boiled milk kept for a few weeks in an aseptic state.

Thus, Mr. President, we had evidence that corrosive sublimate forms, with the serum of the blood, a material, whether we call it a chemical compound or not, which retains the properties of the corrosive subliminate, both as to taste and as to antiseptic virtue. Now, it seems to me highly unlikely that both the characteristic taste of corrosive sublimate and the antiseptic virtue would be retained if the corrosive sublimate were decomposed in any way; and, therefore, I venture to think, speaking with all deference to chemists, that we have not here a chemical combination in the ordinary sense, but an association of particles, such as occurs in solution; not an albuminate of mercury, but an albuminate of sublimate, if I may use such an expression: a loose association of particles of chloride of mercury with albumen. If such be the case, I need hardly point out how important this may be with reference to the surgical uses of corrosive sublimate. The discharges, in passing through a sublimate dressing, may acquire from that dressing chloride of mercury, still in solution, though associated with albumen, and still retaining antiseptic properties.

I may conclude this matter of the relations of the blood serum to corrosive sublimate by showing some illustrative specimens. I found that if serum is mixed in small proportion with corrosive sublimate in a mortar, the result is the production of a thick opaque, slimy material; but if you add a little more, and still a little more, you get this material redissolved in the serum, until, if you used as much as 150 parts of serum to 1 of sublimate, you get a clear solution. This test-tube contains serum from the blood of a horse mixed with one two-hundredth part of corrosive sublimate. You will see that there is no precipitate here at all. This other test-tube contains the same amount of corrosive sublimate (1 to 200); but the liquid mixed with it, instead of being serum simply, is serum with an equal part of distilled water; and here we have what the chemists describe as a precipitation of the albumen, the upper part of the liquid being clear. Now, this upper part of the liquid contains exceedingly little corrosive sublimate; it has almost all gone down with the albumen; but, if we take some of this precipitate itself and mix it with more serum, it will be redissolved by that serum. This afternoon I mixed some of this precipitate with some serum already containing one-four-hundredth part of sublimate, and the result has been the clear solution that you see here. This albuminate, if we are to call it so, is therefore highly soluble in blood-serum and that is one important point to which I wish to direct attention.

While the sublimate is thus, so to speak, intact when associated with albumen, it is rendered very much milder in its action. I took some of the serum which had come through the 10 per cent. wool, containing 1 part of corrosive sublimate to 160 parts liquid, soaked a piece of lint with it and applied it to my arm, put over this a piece of thin mackintosh cloth to prevent evaporation, and secured this with rubber adhesive plaster. I retained this in position for twenty-four hours, and on its removal found an absolute absence of any irritation, although my own skin is pretty sensitive. We have seen how, in twenty-four hours, 1 part of sublimate to 500 of water already produced pustules; yet here 1 part to 160 of serum produced no irritation whatever. The association, then, of the albumen with the corrosive sublimate greatly mitigates its action, and makes it much less irritating. Thus we are able to understand how the discharges coming from a wound soaking a sublimate dressing may not

cause irritation, although the dressing may contain a large proportion of corrosive sublimate. Such being the case, I hoped that we might be able to use corrosive sublimate in pretty strong proportions in a gauze for the dressing of wounds ; and, therefore, not very long ago, in a case of psoas abscess, I applied gauze containing 5 per cent. of corrosive sublimate with a little gum arabic to prevent the crystals flying off. On changing the dressing the following day, I saw in the vicinity of the wound all perfectly satisfactory; but the discharge having gone principally backwards, I found that the further I looked towards the sacrum, the more and more evidence of irritation did I find, until over the sacrum itself, beyond the edge of the dressing, there was absolutely a large vesicle. How was that to be explained ? The explanation I believe to be simply this. If an albuminous discharge travels through a dressing containing corrosive sublimate only, it, in the first instance, forms, with the corrosive sublimate, a non-irritating albuminate, so to speak, but leaves more or less of its albumen behind in the form of a precipitate. As it goes further, and meets with more corrosive sublimate, it leaves more albumen behind, and so, as it advances, becomes more and more nearly a watery solution of corrosive sublimate, producing the highly irritating effects with which we are familiar. This result I confess made me at first despair of using corrosive sublimate in anything like a concentrated form as a surgical dressing. But it afterwards occurred to me, might it not be possible, as corrosive sublimate associated with albumen is so little irritating, to associate albumen with the corrosive sublimate in the dressing? Where should you get your albumen from ? Well, we may get it from horse's blood. There are in every town horse-slaughterers. If you stir horse's blood while it is coagulating, you may get from one animal some gallons in the form of serum. There is the albumen for you, if it only can be made useful. There is a horse slaughterer in the north of London who will let us have this serum absolutely for nothing ; it is simply a useless material to him. This being so, I ascertained in what proportions the serum and the sublimate might be mixed, so as to give a workable article; and I find that you may employ them in almost any proportions. If you use a very small amount of serum, you get, indeed, a thick opaque substance ; but this can be perfectly well blended with gauze or other materials. Here is a gauze which has been charged with serum containing 1 part of corrosive sublimate to 75. Two and a half parts of the liquid are required for one part of the gauze ; and you will see that this is not at all an unpleasantly constituted substance, physically. It is destitute of odour ; you will scarcely perceive it to the taste ; and you would hardly believe that it contained nearly three parts per cent. of corrosive sublimate.

The corrosive sublimate is so intimately blended with the serum that when it dries (as seen on this plate of glass) no separation of crystals takes place. Whether we use 1 to 100, 1 to 70, 1 to 50, or even 1 to 30 parts of blood-serum, they are perfectly amalgamated, and therefore, from a gauze like that, no corrosive sublimate can fly off. It can be manipulated as you please. And as applied dry to the skin, it is absolutely unirritating. If, however, such a gauze is torn, it gives off a dust which irritates the nostrils. It is therefore better to cut it with scissors. Then, in the next place, it is unirritating as acted on by the perspiration. If water is made to act on sublimated serum dried, it does not redissolve it, as serum does, but it renders the mass opaque, the water being only partly absorbed into it; and the water which remains unabsorbed contains exceedingly little of the corrosive sublimate, which is almost all retained by the albumen. Hence, when perspiration soaks into such a dressing, though it moistens it, it does not produce irritation. I made some gauze with serum so strong with corrosive sublimate as to have 1 part to 30, which implies more than 6 per cent. of corrosive sublimate in the gauze. I moistened a piece of this with distilled water, and fixed it on my arm for six hours in the manner before described ; and, when I removed it, I found the skin free from irritation. Thus, you will observe that, by associating albumen with the corrosive sublimate, we seem to be able to get rid of its irritating properties.

But the important question arises, Does corrosive sublimate, when thus associated with albumen, retain sufficient antiseptic virtue for surgical purposes? The method of experimenting which I have described is adapted for testing the efficacy of any antiseptic dressing, and I have used it for various others besides sublimated ones. I have employed it with serum for salicylic cotton-wool, for iodoform cotton-wool, for eucalyptus gauze, and for carbolic gauze. I have mentioned that the test is an exceedingly severe one, and I find that after the lapse of a few weeks, salicylic wool soaked with serum and inoculated as above described stinks, and the same is the case with iodoform wool; the eucalyptus gauze, however, if freshly prepared remains pure, as also does carbolic gauze. We have seen that the 1 per cent. sublimate-wool resisted, still more the 5 per cent. and the 10 per cent. In accordance therefore with our previous experiments with iodoform and salicylic acid, they did not stand the test as well as carbolic acid, or eucalyptus, or the corrosive sublimate. But we get a different result if, instead of using serum of blood, we use serum mixed with blood-corpuscles, such as we readily get from the cow, in which the corpuscles do not aggregate so closely as in the horse, but remain suspended in the serum. I need not, of course, tell any members of this Society that the corpuscles are enormously richer in proteid substances than the serum is, so that serum and corpuscles contain about two and a half times as much of proteid material as the serum does; and as albuminous materials mitigate the action of the corrosive sublimate, they cannot fail to interfere more or less, also, with its antiseptic action; and when we use serum and corpuscles, instead of serum only, we find that the sublimated wood-wool (which I should have said did very well with the serum so far as the sense of smell indicates) fails completely. The 1 per cent. sublimate-wool failed also; the 10 per cent., however, stood the test perfectly, even with blood in substance. Now, as to our gauze made with albumen associated with the sublimate, the sero-sublimate gauze. Such a gauze prepared with 1 part of sublimate to 100 of serum stood the test absolutely when tried with serum. It therefore proved itself superior to salicylic and to iodoform wool. But with the blood in substance, how does it behave? The tube in this bottle contains a portion of the gauze treated with the cow's blood, serum and corpuscles, and inoculated nearly a month ago in the same potent manner to which I have referred, and you will observe that it has in putrid odour. Really, then, this sero-sublimate gauze seems to stand the test completely. I may say that, when tried with corpuscles and serum, our best eucalyptus gauze failed utterly, so that everything failed that I have tried except the stronger sublimate preparations and the carbolic acid gauze.

Then the question comes, How far may we go in the strength of our sublimate combined with the albumen without causing irritation? During the last three weeks, my cases at the hospital have been dressed with this material. We have used the kind of gauze which you have in these bottles, made with 1 of sublimate to 100 of serum, and also one made with 1 of sublimate to 50 of serum. We find that the 1 to 50, in the majority of cases, has caused no irritation whatsoever, but in a very few it has caused some irritation, which, however, has disappeared, and the sores caused by the 1 to 50 have healed when the 1 to 100 has been substituted for it. Therefore it looks as if we were very near our limits, as if that prepared with 1 of sublimate to 100 of serum was trustworthy and unirritating, even to all skins, and that prepared with 1 to 50 was unirritating to most skins. Now, there is this to be observed for our comfort, that the discharge

both from wounds and from abscesses antiseptically treated is a serous discharge, not a bloody one, except in the case of wounds during the first twenty-four hours; and even in the first twenty-four hours, except in cases in which the dressing has to be taken down for reactionary hæmorrhage, the blood is always more or less diluted with serum. If, therefore, we have a dressing which has stood our severe test with serum mixed with the full amount of corpuscles, we are surely not wrong in regarding it as trustworthy. . . . .

I have here a sample of a very cheap fibre, sent me from the south of France, prepared with this sublimated serum, and then teased out, showing that we may use this material for charging various fabrics. This is highly absorbent; and I may remark that, if we have a very highly absorbent dressing, we may, and must, use a larger proportion of the sublimate. A gauze will absorb only about three times its weight of liquid; cotton-wool will absorb ten times its weight; and therefore you observe, when the one dressing is saturated it has three times as much of the liquid in it, and thus has the sublimate three times as much diluted. Being so much diluted it will be in proportion less irritating, but the stronger proportion is required to make it safe unless you use it in a very large mass. I believe the French *charpie* made of old rags, or even old rags themselves, might be quite well prepared with sublimated serum. I have here some rags which have been so treated, and which are quite absorbent, and therefore the dressing promises to be a very cheap one. If the serum is treated with a certain proportion of sublimate, not sufficient to make it solid, it may be kept for any length of time. For aught I know, this sublimated serum may come to be an article of commerce, which may be used in hospitals, or even in private practice. I also think it possible that a material of this kind, dried and reduced to powder, may come to be used for the purpose of mixing with vaseline for an antiseptic ointment, or even for dusting in, under certain circumstances, among our dressings.

SPIRITUS ODORATUS AND OTHER PERFUMES.*

BY R. ROTHER.

As an agreeable perfume the official U.S.P. spiritus odoratus is not a phenomenal success, but the formula is phenomenal in so far that it is the first attempt on record to produce a fragrant essence with an overwhelming proportion of oil of rosemary. An essence of rosemary was surely not contemplated, but the result is certainly nothing else, nor ought anything else to be expected under the circumstances. It is furthermore to be regretted that the unprecedently large proportion of precious neroli is wholly wasted in such a connection. Had the amount of oil of rosemary flowers been one part, at most, instead of eight parts, something like a good cologne water would have resulted from the official formula. Acetic ether is a perfectly gratuitous adjunct which is not known to perform any useful function in such a mixture. There is probably no well established precedent extant that could warrant its addition. The volatility of acetic ether contrasts extremely with that of the other ingredients excepting the alcohol and water. The action of the alcohol and water is merely that of a solvent and diluent. In use the permanent presence of the alcohol would be decidedly undesirable, and hence it cannot evaporate too soon. The spirituous effusion may be momentarily agreeable and refreshing, but it is not a distinctly essential office of the perfume. If the acetic ether was incorporated with this purpose in view, its action would differ in no wise from that of the alcohol and hence it is most superfluous. Had the intention been to supplement the stimulating effect of the alcohol by means of the ether, the presence of water should primarily have been avoided and perhaps, then, the device would not have suggested itself.

In perfumes generally, the absence of water is highly beneficial for other reasons, and the Pharmacopœia could not have done better than to reduce or altogether abandon the unusually large proportion of water in its spiritus odoratus.

Considering the fact that most essential oils are very odorous, it is somewhat remarkable that their boiling points are so high. Of course, bodies generally are slowly dissipated at the lowest temperatures, and, therefore, independent of boiling points, but complete and rapid volatilization can generally be effected only at the temperature of ebullition. Nevertheless the distillation of volatile oils is effected in conjunction with water. The explanation that is generally given of this peculiar effect is that the oil is not transformed into vapour, but that it is carried over mechanically with the steam. At the boiling heat of water some of the oil would certainly become vaporized, but by no means in sufficient quantity to account for the rather large transmission. The writer believes that a plausible explanation is afforded in the assumption that vapours dissolve one another at temperatures independent of their respective boiling points, forming mixtures or rather solutions having characteristic features of stability at certain specific temperatures similarly to solutions in general. In an analogous manner solids absorb liquids and gases. This action becomes again very valuable in the use of perfumes.

It has long been empirically known that the presence, even in small proportion, of certain solids imparts greater lasting qualities to perfumes undergoing consumption. For this purpose ambergris and musk stand pre-eminent, then follow orris, tonka, benzoin, etc. There is scarcely a compound odour of any note that does not contain one or more of these substances. The most excellent perfumes are not without ambergris and musk. Most of these bodies, are exceedingly agreeable odours in themselves when properly diffused, and although they do not make up the mass of the compound containing them, they are nevertheless its most important and enduring components.

Musk was officially recognized in the older U.S. Pharmacopœia, but the new one gives a formula for a tincture of musk. This preparation is officially sanctioned only as a medicine, being compounded in the remarkable proportion of one part in ten parts of diluted alcohol and is five times as strong as that of the German Pharmacopœia made with the same menstruum. Musk must certainly be an important and reliable therapeutical agent, when compared with others of similar effect, in the light of its fabulous cost. It is, moreover, strange that so little of the most ordinary physical and chemical properties of such a presumably valuable substance should be known. No modern analysis of musk appears to exist. The Pharmacopœia, in speaking of its solubility, says that one-tenth of it is soluble in alcohol and one-half of it in water. This leaves everything in doubt as to the relative efficiency of these solvents upon the activity and wherein this really resides. The writer, in operating upon the best obtainable "grain" musk, found that strong alcohol readily and completely abstracts the odour and bitter flavour in the formation of a light brown-yellow solution. The residue, when treated with water, yields an insoluble residue and a clear and deep brown-red solution having neither taste nor smell. The addition of potash to this solution deepens the colour, and aside from evolving a little ammonia and imparting a slight soapy odour, like that produced by alkalies with animal tissues in general, no other change was noticed. Therapeutically it would now be important to know whether the alcoholic solution or the aqueous extraction of the residue contains the medicinal activity. As far as the sphere of perfumery is concerned, this result shows that strong alcohol, pure and simple, is the proper menstruum for extracting musk.

The action of water on musk gives a brown-red, opalescent, moderately bitter and odorous solution together with a residue. Treatment of the solution with

* From the *American Druggist*, October, 1884.

potash evolves a profusion of ammonia and modifies the odour, however, to no advantage. The residue, when acted upon by strong alcohol, leaves a further residue and produces a light brown-red solution, which, on evaporation, yields a considerable odorous and bitter residuum. From these results it appears that water extracts the odour and taste only partially, and that the remnant probably retains the bitter part. The presence of water doubtless exerts a prejudicial influence on musk. This effect is, however, not observable with the alcoholic solution. It appears, therefore, that some of the constituents of musk, naturally co-existing, when caused to re-act by the intermediation of water mutually destroy each other. The writer some years since found that an apparently good sample of musk on treatment with alkaline water became totally inert as a perfume.

It is a great fallacy to believe that alkalies develop the odour of musk. They strengthen the odour in so far as abundant effusion of ammonia is concerned, and modify it to the extent of supplanting it with a soapy effluvium. If it is desirable to incorporate an alkali, borax is preferable as it produces little or no change. In this connection it may not be inopportune to state that borax, in some instances, acts beneficially in regenerating odours that have "turned" or "soured." Some time since the writer had a large bottle of imported bouquet jockey club which shortly after opening acquired a sickening odour. It was mixed with some cheap cologne made of bergamot, lemon, lavender and tolu, and it tainted the whole. After treating small portions of this mixture with various agents, borax was applied to some of it and appeared to improve it. All the mixture was then treated in a similar manner and filtered after macerating about a week. The product was quite good and readily saleable.

Ether acts on musk by leaving a residue and forming a faintly yellow solution. The residue is free from bitterness and the odour and flavour of musk, but it has a strong, purely saline taste. It imparts to alcohol a deeper tint than that of the ethereal solution, but no bitterness and smell. The ethereal extraction yields on evaporation an outer margin of transparent, light brown, unctuous matter, having a bitter taste and the odour of musk, and an inner circle of colourless, tasteless, and odourless fatty substance. The weight of the total extract is about 25 per cent. of the musk.

Chloroform acting on musk gives a residue and a faintly brown-yellow solution. The residue has a strong, salty taste, but no bitterness and odour. The solution leaves, on evaporation, a transparent, light-brown, fatty mass, of bitter taste and the odour of musk. The amount of extract is somewhat less than that given by ether.

It appears from these results that the odour and bitterness go together, and are in all probability the characteristics of a single definite substance representing the fundamental features of musk. It is also evident that chlorform yields a product approximating the pure principle closer than the results given by the other solvents. Alcohol does not wholly dissolve the ethereal and chloroformic products. It dissolves the ether extract, excepting an inert white portion, and from the chloroform residue it takes up all but a few brown, oily globules. These various residues are scarcely affected by dilute alkalies and acids during a moderate period of reaction, but such effect as does result is in nowise beneficial.

Next to the more important solids used in perfumery, stands oil of rose, among the liquids. Nearly all bouquets of the first order contain this delicious scent. Neroli, or the oil of orange flowers, is also highly important, and finally, aside from innumerable other essences occasionally incorporated, the oils of bergamot and lemon, and frequently lavender, constitute the bulk of most compound perfumes.

Many of the fine bouquets are produced by copious additions of the tinctures prepared from various flower pomades. Although these valuable adjuncts lend the superficial freshness so much admired, they are by no means important, as a great number of most excellent odours are generated without their aid. In fact, the jasmine tincture is fairly competent to replace all others.

A false impression largely prevails that an increased number of ingredients augments the excellence of odours. Owing to this belief and the formidable combinations resulting from its practice, comparatively very few perfumes are compounded in a small way. Most of the best odours are, however, very simple in structure. The art of perfumery consists in skilfully combining a relatively few fundamental odours so that, whilst effecting their perfect blending, a new aroma results, superior to each component separately. To illustrate this, the following formula is given as an example of a remarkably sweet and lasting perfume produced in this manner:—

Oil lemon	½ fl drachm.
Oil rose	40 drops.
Oil orange flowers	15 drops.
Orris root in coarse powder	1½ drachms.
Tonka bean in coarse powder	1 drachm.
Musk in grain	7 grains.
Alcohol, 80 per cent.	24 fl ounces.

Mix and macerate for seven days, and then filter.

The improvement the writer would suggest in this formula is to employ a full strength, highly rectified or deodorized alcohol, commercially termed "cologne-spirit," and first prepare with this a tincture of the orris and tonka, to which the other ingredients be then added, and the mixture again filtered after due maceration.

In conclusion, the writer will append a formula for a very rich and lasting cologne water, infinitely superior to the official article and less costly. It is a modification or rather simplification of formula which the writer published in the *Tennessee Pharmacal Gazette* for January 27, 1875, p. 28:—

Oil bergamot	12 fl. drachms.
Oil lemon	6 fl. drachms.
Oil lavender flowers	2 fl. drachms.
Oil orange	2 fl. drachms.
Oil rose	2 fl. drachms.
Oil musk, grain, genuine	4 grains.
(Or good commercial extract musk	16 fl. drachms.)
Cologne spirit	7½ pints.
Water, sufficient to make	8 pints.

Mix the cologne spirit with 5 fluid ounces of water and add the remaining members of the formula; macerate the mixture for five days and filter.

Even if desirable, it would be impossible to clarify by simple filtration a cologne immediately after mixture, or any similar compound rendered milky by the addition of water. Such turbid solutions in many instances clarify themselves spontaneously in time, and thereupon filter clear and readily. When, however, as is often done, it is attempted to force a clarification by passing the liquid through magnesium carbonate, or similar absorbing agent, the operation is tedious and imperfect. As a rule, readily filterable mixtures result when the dilution of the menstruum is first performed before adding the oils. This rule also applies with great success in the preparation of elixirs and aromatic waters in conjunction with the essential clarifying medium. In these cases the oils are first triturated with the absorbent powder and then incorporated with the completed menstruum by gradual addition and constant stirring. This procedure insures a saturated solution which at once filters perfectly clear and rapidly. Precipitated calcium phosphate has repeatedly been suggested for this purpose, for which it is unquestionably superior to all others. In general it is not advisable to filter colognes through absorbing powders, but least of all through magnesium carbonate or charcoal. The calcium phosphate appears to be unobjectionable here, and the writer believes that filtration through it even secures immediately the desirable blending of the ingredients ordinarily termed "ageing."

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 1, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BOARD OF TRADE ON THE WEIGHTS AND MEASURES ACT.

THE annual report by the Board of Trade on the proceedings and business under the Weights and Measures Act is always welcome as containing a *résumé* of the more important incidents that may have occurred during the year in connection with the working of the Act, and the more so because of the commendably impartial attitude which the Board has consistently maintained towards all parties interested in this piece of legislation. In the latest report, which has been delivered during the last few days, there are several passages worthy of notice, not the least important being one stating that the Act continues to work fairly satisfactorily, and that recent representations to the Board have been rather in respect to increased accuracy in the verification of weights and measures than to greater stringency in the detection of fraud. This subject of the accurate verification of weights and measures is evidently one pressing for attention, for it is admitted in the report that weights which are stamped by the inspector of one district are sometimes condemned as inaccurate by the inspector of another. It is true that, as the Board points out, the Act particularly provides that a weight or measure once duly stamped may afterwards be used in any part of the kingdom without being restamped. But in the eyes of some over-officious officials this does not cover the possession of a weight or measure that is incorrect, though stamped, and this view of the law has before now been productive of much inconvenience. Moreover, in no case would it be safe to continue to use a stamped weight or measure after it has been pronounced incorrect by the inspector of the district, and the penalty for the mistakes or carelessness of the original official verifier has to be paid by the innocent trader in the sacrifice of his property. Closely connected with this point evidently is the possible variation of opinion among inspectors as to what is the degree of accuracy that should be required. Indeed, it appears that the opinion of the Board has been sought by local authorities as to whether an inspector may allow a margin of error on a measure brought to him for verification, and it has been suggested that the Act might define the amounts of error to be allowed on all trade weights, measures and weighing instruments. The Board takes a common-sense view of this question, and points out that considering the great variety of weights and measures used in trade and the purposes for which they are employed it would be impracticable to establish a hard and fast limit of error. It is remarked that whilst it is desirable that there should be no practical difference between the inspector's standards and the articles he verifies, yet no two primary standards have ever been compared between which some difference could not be found, and the Board therefore considers it is within the discretion of each inspector, subject to the approval of his local authority, to say what is a "correct" weight or measure. In using this "discretion," the inspectors are told, it is necessary to bear in mind the use for which the particular weights or measures are intended, though the amount of error allowed should not be more than sufficient to meet unavoidable errors of manufacture. An illustration of what is meant by this recommendation is probably to be found in a suggestion in respect to publicans' ordinary glass measures,—about which inspectors differ widely in opinion,—to the effect that in no case should the variation from the imperial standard exceed four fluid drachms on the pint or three fluid drachms on the half-pint, whilst no error in deficiency should be allowed. In order that inspectors may be enabled to verify weights satisfactorily the Board considers they should have at least four scale-beams for indoor work, one for weights from 56 lbs. to 14 lbs., to weigh to 5 grains; one for weights from 7 lbs. to 2 lbs., to weigh to 1 grain; one for weights from 1 lb. to 1 oz., to weigh to $\frac{1}{10}$ grain; and one for weights from 1 oz. to 1 grain, to weigh to $\frac{1}{100}$ grain.

It is one of the curious effects of the Weights and Measures Act that the weight representing the "hundredweight" of 112 lbs. was by it rendered illegal, as there is no legal standard of such a weight. Chambers of Commerce have memorialized the Board of Trade for the legalization of such a standard, but without success; it does, therefore, seem rather inconsistent for the Board to remind the public that every sack of coals should weigh 224 lbs., and that weights and scales for testing this should accompany the coal when delivered. It is also surprising to learn that there are fourteen districts in which manorial jurisdiction overrides the provisions of the Act. Thus, in the manor of Titchfield, Hants, certain officers of the manorial court, called "ale tasters," examine the weights and measures of persons living within the manor, and the court punishes offences, the lord of the manor exercising by prescription the powers of a local authority, without being liable to the obligations of the Act.

The report shows perhaps some advance in respect to the establishment of the metric system in this

ountry, though only to an infinitesimal degree. The Board of Trade formally records its opinion that the time has now come when the United Kingdom might join the International Convention on Metric Standards under proper conditions, provided such a course is not taken as indicating an adhesion on its part to the metric system. Renewed comparison between the imperial standard pound and the new "kilogramme prototype" of the International Bureau has shown that the imperial pound is equal to 453·5924277 grams. A similar inter-comparison of the yard and the metre, made by Professor W. A. Rogers, has given the length of the metre as 39·37027 inches. Both of these measurements vary from previous accepted ones only from the fourth place of decimals. In Germany, we are informed, by a law promulgated on the 11th July last, the "metre" has been legally declared the basis of all weight and measure and the weight of distilled water contained in a cubic decimetre, in a vacuum at a temperature of 4° C., is to be the unit of weight, a "kilogramm." The demoninations to continue in use are, for length, the "millimeter," "centimeter" and "kilometer"; for surface, the "ar" and "hectar"; for capacity, the "liter" and "hectoliter"; and for weight, the "gramm," "milligramm" and "tonne," the last being defined, by an evident mistake, as "$\frac{1}{1000}$ kilo." In Costa Rica also, by Congressional decree, the metric system is to come into operation on the 10th of August, 1885.

Last week we were able to state that the date for official opening of the Pharmaceutical Society's new house, 36, York Place, Edinburgh, had been fixed, and this week the official notices on the front page of the Journal include the formal invitation from the President, Vice-President and Council to the Members and Associates of the Society to take part in a Conversazione to be held on the evening of Thursday, November 13. One declared object of the Council in providing premises worthy of the position of pharmacy in Scotland has been to arouse in that country a greater interest in the Society, and as there are probably many registered chemists and druggists resident in the North, who though as yet unconnected with the Society would like to be present at the Conversazione, arrangements have been made for sending invitations to such persons upon their communicating their wishes to Mr. Peter MacEwan, at 36, York Place. It will be seen also, from an advertisement, that on the evening of Wednesday, the 12th, there is to be a Dinner of Scottish Pharmacists held in the Royal Hotel, Edinburgh, full particulars concerning which may be obtained from Mr. MacEwan.

* * *

An Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, the 5th inst., when papers will be read on "The Approximate Constituents of Hedychium Spicatum," by Dr. Thresh, and on "The Presence of Oxides of Mercury in Blue Pill and in other Mercurial Preparations," by Mr. Harold Senier. A considerable number of donations to the Museum, which have been presented during the last six months, will be shown, and attention will be called to various new forms of continuous exhaustion apparatus.

* * *

In the House of Commons, on the opening night of the session, Mr. Warton gave notice that on Tuesday, the 11th of November, he would call attention to the manner in which the Government has dealt with the question of the sale of poisonous patent medicines, and move a resolution.

* * *

Although there is so little prospect of legislation during the present short parliamentary session upon more than one subject, several Bills have already been introduced and among them one to extend certain provisions of the Factory Act to shops. It bears the name of Sir John Lubbock, but is free from the objectionable provisions contained in the Bill introduced by the same member last session, to which we called attention at the time. It simply provides that a "young person"—defined as a person of the age of thirteen years and under the age of eighteen years—shall not be employed in a shop for a longer period than twelve hours in one day. The word "shop" includes retail and wholesale shops and warehouses in which assistants are employed for hire, but not licensed public houses nor refreshment houses of any kind.

* * *

On another page will be found a report of the decision of the magistrates at Fenton, Staffordshire, in the case of a herbalist charged with selling savin as saffron, which appears to be based upon a new, and as we believe, indefensible reading of the Sale of Food and Drugs Act. The defence set up at the first hearing, that the article sold was the saffron of the herbalists, seems to have been abandoned at the second, and amongst other new pleas started was one that as the article sold was in a pure state there was no adulteration. Astonishing as it may seem, the case was dismissed on this ground, though the old quibble that substitution of one article for another is not adulteration is amply guarded against in the sixth section of the Act, which constitutes as an offence the selling of an article which is not of the nature, substance and quality of the article demanded by the purchaser. However, the defence itself furnishes evidence that the provisions of another Act have been broken, and although the police have been foiled in a first attempt there is no reason why they should not prosecute the seller for an offence against the seventeenth section of the Pharmacy Act in selling a poison included in the first part of the schedule without complying with any of the legal requirements.

* * *

The first meeting of the Chemical Society for the present session will be held on Thursday next, November 6, at 8 p.m., when the following papers will be read:—"On the Vanadates of the Amines," by Mr. G. H. Bailey; "On the Action of Aldehydes and Ammonia on Benzil" (continued), by F. R. Japp, Ph.D. and S. C. Hooker; "On Isomeric Modifications of Sodium Sulphate," by S. U. Pickering; "Contributions to our Knowledge of Aceto-Acetic Ether" (Part I.), by J. W. James; "On the Origin of Calcium Thiosulphate," by Dr. Divers; and "On Magnesium Hydrosulphide as a Source of Hydrogen Sulphide," by Dr. Divers and T. Shimidzu.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

At a meeting of the Board of Examiners for England and Wales, held on Thursday, October 23, 1884, the report of the College of Preceptors on the examination held on October 14th was received.

Two hundred and eighty-eight candidates had presented themselves for examination, of whom *one hundred and forty-four* had failed. The following *one hundred and forty-four* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Abrines, Gustave Anthony.....London.
Ardern, John William .....Ashton-under-Lyne.
Armour, James.....Kilmarnock.
Auckland, William Henry .....St. Mary Cray.
Basham, Septimus .....South Shields.
Beilvert, Adolphus .....Jersey.
Belcher, Standley.....Birmingham.
Boyce, Frank .....Harrogate.
Brander, Thomas .....Garmouth.
Briggs, Robert Ward .....Derby.
Broadbent, Harry Ralph.....Manchester.
Browne, William .....Northampton.
Cardno, Robert Catto .....Aberdeen.
Care, Harry Bristow .....London.
Carne, Herbert Ensel .....Spilsby.
Cave, Geo. Edwin Osborne.....Bowdon.
Chown, Harry Clement .....Lympstone.
Coles, Charles Nathaniel.....Horsham.
Comely, Robert John .....Banbury.
Cooper, Charles .....East Hardwick.
Corfe, Alfred Frederick .....Maidstone.
Craven, James .....Blackburn.
Crawford, Lindsay Oswald.....Norwich.
Crosland, William Howard ...Darlington.
Crozier, George Dixon .....Carlisle.
Dalwood, John Hall .....Sherborne.
Davies, David Price .....Llanybyther.
Davies, Herbert .....Newtown.
Dawson, Charles .....Aberdeen.
Day, William .....Hull
Daykin, Thomas .....Alfreton.
Doble, Arthur Glendower .....Tavistock.
Don, Charles.....Aberdeen.
Dowling, Robert, junior .....Reading.
Downes, William Francis .....Wilmslow.
Dukes, Edward Thomas .....Penkridge.
Edwards, Edward .....Llangefni.
Etchells, Harry Herbert.....Stamford.
Fallding, Harry Bennett .....Sheffield.
Fast, John Percival .....Wellingborough.
Fotherby, Wm. Albert Henry...Burnley.
Fielding, Clement.....Elland.
Flatman, Frederick John ..... Cambridge.
Fraser, John .....Dundee.
Gee, George Henry .....Sandbach.
Glover, Henry Joseph .....Edinburgh.
Goldthorpe, Arthur .....Doncaster.
Gray, Alfred.....Hull.
Green, Thomas John .....Coggeshall.
Greenwood, Soloman .....Wisbech.
Grier, James.....Peebles.
Grimshaw, William Henry.....Blackburn.
Haig, William .....Markinch.
Hall, Samuel William.....Lichfield.
Hamilton, Robert.....Edinburgh.
Hampson, Arthur.....Southport.
Handford, Frank Alexander ...Crewe.
Harper, James .....Edinburgh.
Harper, James Eder .....Oldbury.
Harris, Frank Anderson .....Worksop.
Heath, Victor Charles... ....Birmingham.
Heath, William .....Derby.
Hoole, Herbert Edward .....Sleaford.
Howard, Arthur .....Stamford.
Hura, William .....Nottingham.
Ibison, Robert Johnson .....Carnforth.
Innes, John .....Dufftown.
Jenkins, Owen John .....Neath.
Johnston, John.....Forfar.
Johnstone, Weston .....Sandbach.
Jones, Evan .....Llandovery.
Jones, John Ellis.....Clynnog.
Kent, John Edward.....Lincoln.
Kerr, William .....Dumfries.
Kirkness, George David .....Kirkwall.
Laing, John Wm. Anderson ...Southport.
Lawrence, Charles Augustus ...London.
Leask, John ....Leith.
Leigh, Arthur .....Southport.
Leighton, Thomas Taylor .....West Hartlepool.
Lister, David .....Edinburgh.
Lockyer, Benjamin Stanley ...Landport.
McFadzean, John .....Ayr.
Macpherson, Murdo Jno. Robt.Stornoway.
Marshall, Charles Bushby .....Shrewsbury.
Marshall, Hay McDuald G. ...Elgin.
Marston, John Thomas .....London.
Medcalf, Percy.....Haverhill.
Merrifield, John Harry .....Plymouth.
Middlemass, George Robert ...Stockton-on-Tees.
Montgomery, John Stuart .....Southampton.
Morgan, Llewellyn .....Merthyr Tydfil.
Pain, Charles Frederick .....Dover.
Parker, Charles Frederick .....Liverpool.
Parry, John .....Talgarth.
Patton, James .....Aberdeen.
Peacock, Louis .....Uxbridge.
Peake, Arthur Walton .....Bristol.
Penty, George ... .Manchester.
Pond, William Ernest .....London.
Price, Herbert Henry Gay ... ..Taunton.
Price, Richard Cameron .....Minsterley.
Purser, Charles William.....Birmingham.
Rennison, Coverdale Smith ...Kirkby Stephen.
Robinson, Charles Edwin .....Nottingham.
Scrase, Frank Edward..... . Bristol.
Sealby, Thomas James .....Maryport.
Sewell, James Walker.....Darlington.
Shadforth, William .....Durham.
Small, Francis .....Dundee.
Smith, Charles .....Wellingborough.
Smith, Stanley J.....Colchester.
Smith, William..... .....Glasgow.
Spurr, Frederick .....Sheffield.
Stewart, Alexander .....Edinburgh.
Swales, John Thomas .....York.
Sworn, Ernest Andrew .....London.
Sykes, Harry .....Uppingham.
Tapp, Charles ....Sittingbourne.
Tayler, Rowland Charles .....Colchester.
Taylor, Dugald.....Helensburgh.
Taylor, Henry Hylton.....Middlesborough.
Taylor, Herbert Henry .....Rugby.
Tench, Sidney Edward .....Brighton.
Thomas, Thomas .....Llandilo.
Thorburn, George Evan .....Newport, Mon.
Treadgold, Alfred Frank .....Derby.
Turner, George Pain .....Taunton.
Vernon, Thomas .....Tarporley.
Walker, James.....Rugby.
Walker, John Young .....Glasgow.
Walker, William Marriott .....South Normanton.
Watson, Edward .....Swinton.
Wells, Arthur John.....Lincoln.
Westmacott, George Leonard...Manchester.
White, James Carter ... .Grimsby.

White, Sidney Bowring .....Worcester.
Whittock, William Henry .....Warminster.
Wilson, George.....Cupar Fife.
Wilson, Luther.....Keighley.
Woodcock, Thomas John .....Norwich.
Woodward, James Henry .....Spalding.
Wright, Cecil .....New Somerby.
Wright, James.....Fleetwood.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	11	7	4	Lancaster	2	1	1
Birmingham	14	7	7	Leeds	12	6	6
Brighton	2	2	0	Lincoln	7	4	3
Bristol	11	4	7	Liverpool	14	4	10
Cambridge	2	2	0	London	39	14	25
Canterbury	3	1	2	Manchester	28	15	13
Cardiff	9	4	5	Newcastle-on-T.	7	2	5
Carlisle	4	3	1	Northampton	7	4	3
Carmarthen	8	3	5	Norwich	5	2	3
Carnarvon	4	2	2	Nottingham	10	8	2
Darlington	7	6	1	Oxford	3	2	1
Dundee	9	5	4	Peterborough	6	5	1
Edinburgh	17	8	9	Sheffield	5	3	2
Exeter	11	4	7	Shrewsbury	6	3	3
Glasgow	8	5	3	Southampton	5	2	3
Hull	3	2	1	Truro	1	0	1
Inverness	2	1	1	Worcester	1	1	0
Jersey	2	1	1	York	3	1	2

The questions set for examination were as follows :—

LATIN.

Time allowed: *from* 11 *a.m. till* 12·30 *p.m.*

I. Translate into English either A. (Cæsar) or B. (Virgil)—

(*The Candidate must not attempt both*):—

A. Caesar.

1. Ita, sive casu, sive consilio deorum immortalium, quae pars civitatis Helvetiae insignem calamitatem populo Romano *intulerat*, ea princeps poenas *persolvit*. Qua in re Caesar non solum publicas, sed etiam privatas injurias ultus est, quod ejus soceri L. Pisonis avum, L. Pisonem legatum, Tigurini eodem proelio, quo Cassium, *interfecerant*.

2. Dum paucos dies ad Vesontionem rei frumentariae commeatusque causa moratur, ex percontatione nostrorum vocibusque Gallorum ac mercatorum, qui ingenti magnitudine corporum Germanos, incredibili virtute atque exercitatione in armis esse praedicabant, saepenumero sese cum his congressos ne vultum quidem atque aciem oculorum ferre *potuisse*, tantus subito timor omnem exercitum occupavit, ut non mediocriter omnium mentes animosque *perturbaret*.

II. *Grammatical Questions.*

(For those Candidates who take Cæsar.)

1. Decline in full *casu*, *consilio*, *Helvetiae civitatis*, *qua re*. (Par. 1.)

2. Give the first person of the present and perfect indicative, and also the supine and infinitive, of the verbs in italics.

3. What person, number, gender, and case is *qui*, and why? (Par. 2.)

4. From what verb does *congressos** come? What part of the verb is it? Explain the construction. (Par. 2.)

* Through a printer's error this word was printed "*compressos*" in the examination paper.

B. Virgil.

1. Postquam exempta fames epulis mensacque remotae,
Amissos longo socios sermone *requirunt*,
Spemque metumque inter dubii, seu vivere *credant*,
Sive extrema pati, nec jam exaudire vocatos.
Praecipue pius Aeneas, nunc acris Orontei,
Nunc Amyci casum gemit, et crudelia secum
Fata Lyci, fortemque Gyan, fortemque Cloanthum.
2. Haec ait: et Maia genitum *demittit* ab alto,
Ut terrae, utque novae pateant Carthaginis arces
Hospitio Teucris, ne fati nescia Dido
Finibus *arceret*. Volat ille per aera magnum
Remigio alarum, ac Libyae citus adstitit oris.
Et jam jussa facit; *ponunt*que ferocia Poeni
Corda, volente deo; in primis regina quietum
Accipit in Teucros animum mentemque benignam.

II. *Grammatical Questions.*

(For those Candidates who take Virgil.)

1. Decline in full *socios*, *sermone*, *pius Aeneas*. (Par. 1.)

2. Give the first person of the present and perfect indicative, and also the supine and infinitive, of the verbs in italics.

3. Explain the construction of *ut pateant*. (Par. 2).

4. From what verb does *volente* come? Explain the construction.

III. *Translate into Latin*:—

C. For all Candidates.

1. The general is braver than his soldiers.

2. It is a Roman's duty to die for his country.

3. The Trojans came to the city of Carthage, which Dido founded.

4. Virtue must not only be cultivated, but also loved.

5. Crœsus sent ambassadors to Delphi to inquire concerning the fortune of the war,

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*).

1. Multiply the difference between 12 cwt. 3 qrs. 17 lbs. 10 ozs. and 5 cwt. 2 qrs. 23 lbs. 11 ozs. by 528.

2. A man paid away $\frac{1}{3}$ of a legacy, then $\frac{1}{4}$ of the remainder, and finally $\frac{1}{6}$ of his first payment. After these three payments he had £90 6*s*. 2*d*. left. Find the value of the original legacy.

3. Reduce $\frac{9}{1\frac{2}{3}}$ of £10 6*s*. $7\frac{3}{4}$*d*. to the decimal of £·015.

4. If ·15 of an estate be worth £280, find the value of $\dot{2}1\dot{5}$ of it.

5. A barrel containing 80 litres of liquid weighs 40 kilog. 5 hectog.; empty, it weighs 3 kilog. 9 hectog.: find the weight of a litre of the liquid.

6. If 13 men in 5 days build a wall $\frac{13}{2\frac{1}{2}}$ of a furlong in length, 5 feet high, and 2 feet thick, what length will 17 men build in 11 days?

7. A. invests £200 and B. £500 in a business; after 4 months A. adds £800, and after 5 months B. adds £700; at the end of the year the profits are £443 5*s*.: how should they be divided?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*).

1. How do you distinguish between *prepositions*, *adverbs*, and *conjunctions*? Give examples.

2. Analyse the following sentence:—"The trumpets had no sooner given the signal than the champions vanished from their posts with the speed of lightning, and closed in the centre of the lists with the shock of a thunderbolt."

3. Parse fully the following sentence:—
"Great wits are sure to madness near allied,
And thin partitions do their bounds divide."

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where requisite:—the traveller made three quick steps towards the jail then turning short tell me said he has

that unnatural captain sent you nothing to relieve your distresses call him not unnatural replied the other god's blessing be upon him he sent me a great deal of money but i made a bad use of it i lost it by being security for a gentleman that was my landlord and was stripped of all i had in the world besides.

5. Write a short composition on *one* of the following subjects:—

The Electric Light.
The Health Exhibition.
The Advantages of Travelling.
Self-culture.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The annual meeting of the Leeds Chemists' Association was held at the Church Institute, on October 9, at 3 p.m. Mr. Samuel Taylor, President, in the chair.

Mr. Chadwick moved, and Mr. Boocock seconded, that the annual report and balance sheet be adopted.

The report stated that to meet a requirement of pharmaceutical students, which was not supplied by any of the educational institutions of Leeds, the Council had made arrangements with Mr. W. Elborne, Owens College, Manchester, to deliver a course of evening lectures on the materia medica of the British Pharmacopœia. A hope was expressed that the associates would appreciate so valuable an opportunity and that the lectures would be heartily supported.

The following officers were elected:—President, Mr. George Ward, F.C.S.; Vice-President, Mr. James Abbott; Hon. Treasurer, Mr. James A. Hirst; Hon. Secretary, Mr. F. W. Branson; other members of Council, Messrs. J. Boocock, E. O. Brown, P. Jefferson, S. Taylor, Wm. Smeeton, E. Yewdall; Messrs. W. Powell and E. Brown were appointed Auditors; Curator, Mr. Rushton; Librarian, Mr. Pollitt.

The annual supper and first ordinary meeting of the session took place on October 16. Mr. George Ward, F.C.S., President, in the chair. Thirty-five members and their friends were present.

Letters were read from Messrs. R. Reynolds and W. Smeeton regretting unavoidable absence.

After the confirmation of the minutes, the President gave the—

Inaugural Address.

Commencing with a brief abstract of the history of pharmacy from the work of Messrs. Bell and Redwood, starting with the year 1511, when an Act was passed "for the appointing of physicians and surgeons;" Mr. Ward said the physicians' assistants were then called apothecaries, and as they acquired a knowledge of the drugs they had to dispense they began to transact business on their own account. In 1518 Thomas Linacre, physician to Henry VIII., proposed the establishment of the College of Physicians. In the year 1540 the powers of this body were extended, empowering the physicians to enter the houses of the apothecaries to search their stock, and to destroy such as was unfit for use, and in the same year the barbers and surgeons were united to form one company, the surgeons were prohibited from shaving, and the barbers were not to perform any surgical operations beyond the drawing of teeth. In 1542 the surgeons, having abused their knowledge, an Act was passed allowing persons having a knowledge of diseases and medicine, to practise without remuneration; this led to the rapid increase of empirical impostors, many of whom met with severe punishment. In 1553 the College of Physicians obtained a new Act confirming and enlarging their former powers, authorizing them "to survey, govern, correct and punish all and singular physicians and practisers in the faculty of physic, apothecaries, druggists, distillers, and sellers of waters and oils, and preparers of chemical medicines, acccording as the nature of the offences may seem to require." In 1606 the grocers and apothecaries were incorporated into one company. In 1617 we find the apothecaries were separated and obtained a separate charter. In 1618 the first Pharmacopœia was published, and many substances were recommended for use in medicine which would be regarded with disgust by the patients of the present day. Some of the statements in Culpepper show, however, evidence of careful observation, *e.g.*, in boiling syrups you are directed to "have a great care of the just consistence, for if you boyl them too much they will candy, if too little they will sour." In 1671 the Society of Apothecaries, continuing to prosper since the formation in 1617, added a chemical laboratory to the dispensary, which had been instituted in 1623, and continuing to manufacture chemicals and galenicals, gradually merging into a trading company. In 1694 they obtained exemption from serving as constables and jurymen; the number of apothecaries had very much increased, and they began to practise medicine as well as pharmacy; in this they much excited the jealousy of the physicians, who united together and established dispensaries and supplied medicines on very reasonable terms. In 1723 an Act was passed again empowering the physicians to visit and examine the shops of apothecaries, attended by the Master and Wardens of the Grocers' Company. In 1748 the corporation of apothecaries obtained a charter empowering it to license apothecaries to sell medicines in or within seven miles of London. In 1802 the chemists and druggists formed a society for the protection of their interests. In the year 1813 a general meeting of the chemists and druggists in the metropolis was held at the Freemasons' Tavern, to consider an abstract of a Bill for regulating the practice of apothecaries, surgeon apothecaries, practitioners in midwifery, compounders and dispensers of medicine throughout England Wales. Strong opposition to the Bill was expressed, and a committee was appointed to protect the interests of the trade. Some names which are now quite historic will be found on this committee. In 1819 a meeting of chemists and druggists was held to consider a Bill to regulate the sale of poisons. In 1829 the Druggists' Association formed in 1802 decided to meet twice a year, and to style itself the General Association of Chemists and Druggists of Great Britain. In 1841 the Chemical Society was formed at the suggestion of Mr. R. Warington. In 1843 the Pharmaceutical Society received its charter of incorporation, and since that time to the present period has pursued a steady course of progress in seeking to advance pharmaceutical education and to raise the status of the trade. In continuing his remarks, the speaker observed that the Association was a Chemists' Association, and desired to draw special attention to the fact that the members were expected to be chemists and druggists, that is to say, there was clearly a two-fold character in their calling, whether it was designated by the older and more familiar title of chemist and druggist, or the more modern and high-sounding one of pharmacist. The two-fold character—the scientific and the commercial—should always be borne in mind. They were expected to be chemists, that is, they must be more or less well versed in chemistry. Now chemistry, as understood in this connection, was both an art and a science, and they must not neglect the practical part of their calling, which demanded that they should have acquired by practice the dexterity in manipulation necessary to apply various reagents, and conduct the processes of precipitation, filtration, and ignition, so as to obtain the desired results in the most satisfactory manner. At the same time they must pay the requisite amount of attention to the science involved in all these processes so as to enable them to understand the changes in the nature and properties of all the bodies operated upon. Having informed them

selves of the characteristic features of the simple substances or elements, they must ascertain the various properties of the compounds produced by the union of these elementary bodies, and the conditions which facilitate or retard combinations and decompositions. But they were also to be *druggists*, *i.e.*, they were to buy and sell the various compound and simple substances used as medicines, and not only to buy and sell but to compound those medicines in such manner as would render them most available for the purpose of the prescriber. The province of the chemist and druggist was one of considerable extent, and for the correct performance of his duties there was required a very considerable amount of technical skill and scientific knowledge in chemistry, botany, and materia medica; for he must not only be a tradesman, with very much more of detail, anxiety and responsibility than most other traders, but he must be also a more or less scientific man, and it would only be when both sides of his qualifications were developed that he would in the future be able to take the position which was properly his due. He especially urged upon his young friends the absolute necessity for remembering this two-fold nature of their calling, lest they should sink to the level of a mere dealer; they should cultivate both sides, seeking not to be too scientific, so as to allow the commercial element to fade into the distance, neither to be too exclusively devoted to the merely commercial, neglecting altogether the scientific. A little chemistry and botany would relieve the tedious duties of the shop and would tend to lighten the daily toil. But some were, perhaps, ready to say, This is all very well, but what about the remuneration? what encouragement is there to seek to acquire these qualifications? He was at once ready to admit that at present and for some time past the trade had been "under a cloud;" keen competition, and the want of a proper amount of protection, combined with other circumstances, had brought about a condition of affairs which to say the least was not at all satisfactory, There were already indications of a tendency in the trade to divide into two classes,—the properly qualified pharmacist on one side, and the mere dealer in non-poisonous drugs on the other,—and they would doubtless most of them be ready to admit that an amended Pharmacy Act was much needed. In the meantime he would certainly advise those entering the trade to qualify for the higher position, resting assured that only special knowledge and special skill would entitle them to special protection and advantages. Into the much vexed problem of prices—just now a burning question—Mr. Ward said he would not enter there, but those who were already in the business could not afford to allow their trade to pass out of their hands, and must modify their proceedings to meet the requirements of the times. There was one other subject which might be mentioned in passing, but about which they would doubtless be all agreed, viz., the claims of the chemist and druggist to be officially represented on the Committee for the revision of the Pharmacopœia. The practical pharmacist had special opportunities for observing the alterations required in the processes adopted for the compounding of drugs and of testing the purity and fitness of the various substances used by the medical man, and had, therefore, special claims to have a voice in the work and revision of the national pharmacopœia. Doubtless the efforts of the Pharmaceutical Council would result in concerted action which would be beneficial alike to pharmacy and medicine. A passing word might be said as to the curriculum and examination recently proposed by the Council. He thought one could scarcely avoid the opinion that for the present the scheme as proposed was too pretentious for the circumstances of by far the majority of chemists and druggists' assistants throughout the provinces; a graduated series of examinations, to be taken year by year during the whole of the term of apprenticeship, would very much better meet the want of pharmaceutical students generally, and would tend to prevent the final few months of rapid preparation which is so frequently relied on for the final examination, and would make success at the qualifying examination more certain than the present system appears to do. Another matter that had occupied the thought of some members of the trade was the abolition of the patent medicine stamp, and it might be hoped that this subject was fast coming "within the range of practical politics." Mr. Ward then drew attention to the slides under a number of microscopes illustrative of micro-organisms which accompany specific diseases, and suggested that it would be well to study, as time and opportunity occur, the recent researches as to the history of these minute organisms and their relation to zymotic diseases by Pasteur, Koch, Klein, and others. The speaker concluded his address by impressing upon the assistants present the necessity for association and mutual help. Only by persevering in the pursuit of knowledge for its own sake would the positions to which doubtless all aspired be attained, and to consummate this aspiration he suggested that a students' association should be formed, and that the resources of the library, museum, and reading room should be pressed into the service of the proposed association.

Mr. S. Taylor, in moving a vote of thanks to the President for his very able and interesting address, said that, speaking as an ex-president, he could not refrain from saying a few words about an Association with which he had been intimately connected. There was no doubt as to the fact that the last few years had witnessed a somewhat downward tendency in the career in the history of the Association. This was attributable to various causes; still he trusted the resumption of educational functions by the society (the Committee having arranged for materia medica lectures), and the provision of papers having pharmaceutical interest, would under the guidance of an able president be the means of resuscitating the Association.

Mr. E. Yewdall had much pleasure in seconding the motion, and would have been glad if the President could have brought the historical sketch down to a time when apothecaries would cease to exist, and medical men confine themselves to prescribing, and the pharmacist restrict himself to dispensing. With respect to the bacillus question and the use of antiseptics, it was worthy of remark that our ancestors so frequently added thymol in the form of ol. origan. to liniments, and the question arose as to what substance would prove noxious to these disease-producing organisms and yet prove innocuous to ourselves.

Mr. R. Smeriles, M.R.C.S., in supporting the vote of thanks, said that with reference to the pathology of the bacilli and allied micro-organisms, it was not yet proved conclusively whether the bacilli to be found in consumption and cholera were the cause or the accompaniments of those diseases, but with regard to the bacillus anthracis, which was found in cases of woolsorters' disease, proof had been obtained as to its specific character and its disease-producing capacity.

An announcement that the Honorary Secretary would be pleased to give any information respecting the materia medica lectures, for which fifteen entries had been received, concluded the business, after which a short selection of vocal and instrumental music brought the meeting to a close.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The first meeting of the session was held in the Materia Medica Museum, Owens College, on Thursday evening, October 16. Mr. G. S. Woolley in the chair.

The Secretary having read a report of the proceedings of the past session, the Chairman called upon Mr. A. H. Jackson, B.Sc., President, to deliver the Introductory Address. This will be found printed on p. 336.

At the conclusion of the Address, the Chairman (who had, also, accompanied the British Association on its recent visit to America) fully endorsed the salient points of the President's remarks. He alluded at the same time to a visit he paid to the acetic acid factory of Dr. Squibb, in Brooklyn. The special feature of the method adopted there consists in submitting wood to distillation in iron retorts, at a much lower temperature than that usually employed, when crude acetic acid of a very superior quality distils over, the physical appearance and chemical composition of the residue being so little altered in the process that it is capable of subsequent utilization as fuel. He was also very favourably impressed by the general excellence and ingenuity of the processes devised by Dr. Squibb in making various pharmaceutical preparations, especially evident in the manufacture of liquid extracts, which latter have, during the last few years, become so prominent in American pharmacy. The Chairman then proposed a hearty vote of thanks to the President, which was seconded by Mr. W. Elborne and carried with acclamation.

The next meeting having been announced, the proceedings terminated.

LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting of the thirty-fifth session of the Liverpool Chemists' Association was held at the Royal Institution, on Thursday Evening, October 23, Mr. Edward Davies, F.C.S., F.I.C., President, in the chair.

The minutes of the previous meeting were read and confirmed and sundry donations were announced.

Mr. William Fearentide and Mr. Richard Barnet were unanimously elected members.

Dr. Symes exhibited a specimen of vanilla beans grown in North Brazil. He considered it superior in flavour to the wild, but not as fine as the best Mexican vanilla. It was not yet cultivated on a commercial scale and not even known in South Braxil.

The President thanked Dr. Symes for the communication, which was interesting as bringing under notice vanilla more nearly in its natural state than any that had come under his observation.

Mr. Parkinson drew attention to the fact that olive oil did not appear to him to be the best solvent for dissolving the camphor as ordered by B.P. for Lin. Camph. without artificial heat, which he considered undoubtedly deteriorated the preparation. His experience showed that a combination of olive and neatsfoot oils answered the purpose very much better.

Mr. Thomas Williams then read a paper on "Sanitation," which will be printed in an early number.

Mr. T. F. Abraham moved a vote of thanks to Mr. Williams, which was seconded by Dr. Symes and, on being put, was carried nnanimously.

Parliamentary and Law Proceedings.

The Pharmaceutical Society of Great Britain *v.* Withnall.

In the Salford County Court the Pharmaceutical Society of Great Britain sued N. Withnall, of No. 85, Moss Lane West, Manchester, for a penalty of £5, under section 15 of the Pharmacy Act, 1868, "for selling or keeping open shop for retailing, dispensing or compounding poisons," to wit, laudanum.

Messrs. Cobbett, Wheeler and Cobbett, of Manchester, paid into Court on Saturday, October 25, the sum of £5 and 9*s*. costs.

Mr. J. M. Yates, barrister, instructed by Messrs. Flux, Son and Co., appeared in Court on Monday, October 27, and, pursuant to notice, made application to the learned Judge for an order that the defendant should pay costs on the higher scale, and the learned Judge made an order accordingly.

Poisoning by Phosphorus.

Mr. J. Vaughan, the borough coroner for Devonport, opened an inquiry on Friday, October 24, at the Devonport Guildhall, as to the death of Henry Queenborough, fifty-two, an army pensioner.

Jane Andrews, residing in the same house with the deceased, said the last time she saw him alive was either on Tuesday or Wednesday night. On Thursday morning she knocked at his door and again in the afternoon, but got no answer. When her husband returned from work she told him, and he knocked at the deceased's door with the same result. Eventually a constable was called and entrance obtained through the window, when the deceased was found lying across the bed dead.

Clara Bushell said deceased had long complained of pains in his head, and of sleepless nights, as well as of internal pains. He had asked her to get him morphia, which he said he used to take when in the West Indies, but she declined. Deceased then got some laudanum, procuring a pennyworth from each of three separate chemists. On Friday night deceased told her not to be surprised if she heard that he was dead at any time.

Inspector J. Matters deposed that with a constable he went to deceased's residence, and after some time effected an entrance into his room. On the mantelpiece were two bottles marked "laudanum, poison." The labels were those of different chemists. Each of the bottles contained a little laudanum. On the table there was a small tin box labelled "Barber's phosphorus vermin killer." Some portion of the phosphorus was removed. There was no indication of want in the room.

Mr. F. E. Row, surgeon, stated that he had made a *post-mortem* examination of the body. There were no marks of external violence. On opening the stomach a strong smell of phosphorus was emitted. The internal pains which the deceased had complained of were due to gall stones. The heart, though fatty, was comparatively healthy. All the tissues of the body were loaded with fat, and the state of the lungs was such as to show that they had been affected by disease. The quantity of phosphorus in the stomach, combined with the diseased state of the lung and the fatty condition of the other vital organs, was sufficient, he thought, to account for death. Laudanum or morphia was a proper medicine to take to allay the intense pain caused by gall stones, but not phosphorus. He believed the deceased took the phosphorus with the intention of poisoning himself.

The Jury returned a verdict to the effect that the deceased committed suicide whilst in a state of temporary insanity.—*Western Morning News.*

The Sale of Savin for Saffron.

At Fenton, Staffordshire, on Friday, the 24th October, before H. C. Greenwood and J. F. Wileman, Esqs., Samuel Bowers, herbalist, High Street, Longton, appeared in answer to an adjourned summons, under the Food and Drugs Act, charging him with selling saffron not of the nature and quality of the substance demanded.

The certificate of the county analyst, handed in on the last occasion, stated that the article sold was the young shoots of a savin-like plant, though not the produce of *Juniperus sabinus*, and was not saffron at all.

It was then argued for the defence that the article sold was known to herbalists as saffron, though it differed from the saffron of the chemist.

Mr. T. D. Walker, pharmaceutical chemist, Dresden, now deposed that he had been in business for nearly fifty years, and during that time had frequently sold saffron, which was used mainly for measles, and as a colouring agent. Only one article was known as saffron, and that was the produce of *Crocus sativus*. Savin was used for improper purposes, and, under the Pharmacy Act, chemists were prohibited from selling it, except under severe restrictions.

Dr. J. Fraser stated that he was shown by the county analyst (Mr. Jones) a sample of a drug which was un-

doubtedly savin. Between this and saffron there was not the slightest similarity, and the substitution of savin for saffron would produce very serious results, the former being an irritant, and in large doses a poison.

Mr. Jones, county analyst, was then put in the witness box, and, in reply to the Bench, said that the article sold (savin) was not adulterated, but was pure as a shrub.

Mr. Sword contended for the defence that his client having sold what he thought he was asked for, there was no ground for a prosecution; and that the statute was framed for the purpose of compelling persons to sell food and drugs in a pure state, whereas in the present instance there was no adulteration. That being so, and in the absence of a similar case, he asked that it be dismissed.

Mr. Greenwood did not think the case came within the meaning of the Act of 1872, but under the latter part of the preamble of 1875. Though the defendant did not sell what was asked for, he did not sell an adulterated article. The case was dismissed, his Worship expressing his willingness to grant a case if asked for.

Prosecution for Possession of Unstamped Weights.

On Wednesday, October 22, at Clerkenwell Police Court, Mr. Anderson Forsythe, surgeon, of Great College Street, Camden Road, was summoned, under the Weights and Measures Act, 41 and 42 Vic., cap. 49, for having a number of unstamped weights for use in his business, contrary to the statute.

Mr. Ricketts, solicitor, who prosecuted on behalf of the parish of St. Pancras, said that under the 37th section of the Act, measures, weights, etc., used for the weighing out or measuring of vendible articles, were required to be stamped by a competent authority—in this case the official of the parish. The defendent, when visited by Mr. Gibson, inspector of weights and measures, had been found in possession of a number of small weights used for the dispensing of his drugs, all of which were unstamped. One, a five grain weight, really weighed five and a half grains—a most dangerous difference, as in the case of poison being dispensed it might be the difference between kill and cure. There was no question of cheating the public, the summons having been taken out to compel compliance with the Act for the protection of the public. The evidence of the inspector showed that of the ten weights found, two were light, four heavy, and four were correct. The defendant denied that the weights in question were for use in the shop. They were the same the inspector had complained of before, and had been discarded. The inspector had received them by mistake. A new set had been in use use since May last.

Mr. Barstow said that the evidence before him was quite to the contrary, and he could only act on it. He fined the defendant 40s. and costs.—*Times.*

Obituary.

Notice has been received of the death of the following:

On the 29th of August, Mr. John Hedley, Chemist and Druggist, Houghton-le-Spring. Aged 47 years.

On the 11th of September, Mr. Samuel Hickinbottom, Chemist and Druggist, Sleaford. Aged 51 years.

On the 18th of September, Mr. Alfred Hartley, Chemist and Druggist, Manchester. Aged 45 years.

On the 27th of September, Mr. James Thompson, Chemist and Druggist, London House Yard, London. Aged 31 years.

On the 6th of October, Mr. John Jones Edwards, Pharmaceutical Chemist, Crickhowell. Aged 38 years. Mr. Edwards had been a Member of the Pharmaceutical Society since 1878.

On the 11th of October, Mr. Thomas Jenkins, Chemist and Druggist, Coventry. Aged 72 years.

On the 12th of October, Mr. Joseph Shaw Weir, Chemist and Druggist Merthyr Tydfil. Aged 65 years.

On the 13th of October, Mr. William Golding, Chemist and Druggist, Cricklade. Aged 74 years.

On the 17th of October, Mr. Richard Whitton, Chemist and Druggist, late of Lincoln. Aged 27 years.

On the 19th of October, Mr. Christopher Henry Davies, Chemist and Druggist, late of Arthur Terrace, London. Aged 65 years.

Correspondence.

The Estimation of Hydrocyanic Acid.

Sir,—Referring to the discussion which followed the reading at the meeting of the British Pharmaceutical Conference of Mr. Siebold's paper on the "Estimation of Hydrocyanic Acid," I think Mr. Siebold was scarcely justified in saying that I "condemned" Hannay's process, the real statement made by me respecting it ('Com. Org. Analysis,' vol. i., p. 35) being as follows:—"The author's own experiments are not very favourable to the accuracy of Hannay's process, which, though useful, appears to give only approximate results."

Well, I came to this conclusion, not from the results failing to agree with Liebig's method, but from the fact that the latter was found capable of accurately estimating the hydrocyanic acid present in a liquid, provided Mr. Siebold's precautions were observed, while the results by the mercuric chloride process showed a very sensible departure from the truth. To test the process I prepared dilute hydrocyanic acid by distilling potassium ferrocyanide with sulphuric acid, and I estimated the HCy in the distillate by precipitating a known measure with nitrate of silver and weighing the precipitate. Other quantities of the distillate were assayed by Hannay's and Liebig's methods, with the result that I gave the preference to the latter. I am not prepared to assert that Hannay's method may not be capable of yielding absolute results, but, as already stated, my own experiments were not very favourable to it.

If Mr. Naylor and Mr. Siebold will publish the details of the experiments by which they assured themselves that Hannay's process was "very accurate," they will be doing a service to chemists, and I shall be only too glad to have their results in time to give them due credit in the new edition of my 'Commercial Organic Analysis.' It is only by co-operation that it is possibly to make such a book really satisfactory in every respect, and any assistance they or others can give me in the compilation will be duly appreciated and thankfully acknowledged.

Sheffield. Alfred H. Allen.

Density of Absolute Ether.—We have received a communication from Mr. A. H. Allen, saying that the inconsistency in the densities attributed in his 'Commercial Organic Analysis' to absolute ether at different temperatures, which was pointed out by Dr. Squibb in his paper, arises from a transposition of the figures. He adds that neither statement pretends to be more than a representation of the density of ether generally accepted.

D. Jones.—(1) You can effect your object by preparing a liq. ferri hyposulph. and then mixing it with simple syrup. (2) We cannot tell you where you can obtain such plates. (3) From a wholesale fruiterer in one of the larger markets.

Quero.—(1) Liq. ferri dialysat., properly made, does not gelatinize. See *Pharm. Journ.*, [3], ii., 1010. (2) Potassium bichromate is not mentioned in medical works as being administered internally. (3) We do not know. (4) See the instructions in the United States Pharmacopœia or Oldberg's 'Unofficial Formulæ.'

J. R. Hill.—There need be no fear that the Board will lose sight of the point referred to.

S. L. B.—We cannot suggest a means of averting the deposit and generation of gas, which probably has its starting point in the action of the acid on the alcohol.

Apprentice is recommended to address his question to the Secretary.

Cortex.—See an article on the "Use of Salicylic Acid in the Household" (*Pharm. Journ.*, [3], vii., 595).

Communications, Letters, etc., have been received from Messrs. Burgess, Samuel, Jackson, McNaught.

Medals—1851, 1855, 1862, 1867.

(W. G. BAKER, R. C. HEATH, T. TYRER, W. E. B. BLENKINSOP.)

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1	Do. do. 1/- glass bots.	7/-	0	7	0
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1	Do. Sanitary Powder, 1/-, decorated tins	7/-	0	7	0
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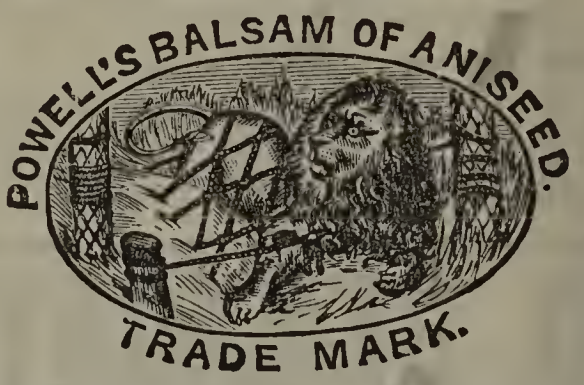

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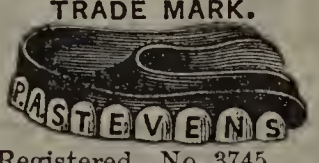

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For destroying ALL INSECTS and PARASITES that infest Trees and Plants, whether at the Roots or on the Foliage. It cures Mildew and Blight on Fruit or Foliage, and a weak solution Kills all Vegetable Grubs, Turnip Fly, &c. Clears Grapes from Mildew or Mealy Bug without affecting the bloom. Thickened with a little clay, makes a good winter dressing. Destroys Lice and Fleas on Animals and Birds. Sold by Seedsmen and Chemists, 1s. 6d., 2s. 6d., and 4s. 6d. a bottle; per post 3d. extra. Per gallon 12s. 6d., or less in larger quantities.

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Your "Honey" is delicious. ELLEN TERRY.

The Lord Mayor of London orders it.

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From the Champion Billiard Player.

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Yours faithfully, JOHN ROBERTS, Jun.

What it did for Geo. F. Black, Esq.

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Mr. S. HASSALL ...	...	... Windsor.
Mr. W. BERRY ...	...	... Manchester.

Further particulars will be given next week.

There are a few vacancies in the classes for the December examinations. Students intending to join are requested to do so with as little delay as possible.

Next year's work will begin on January 5th.

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1.—That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

2.—That letters addressed to initials or to fictitious names at a Post Office are not taken in, but are at once sent back to the writers by the Post Office Authorities.

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Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

J. & A. CHURCHILL, 11, New Burlington St., London, W.

PHARMACEUTICAL PRELIMINARY, LONDON MATRICULATION, AND ALL MEDICAL PRELIMINARIES.

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"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

INSTITUTED 1ST OCTOBER, 1868.

325, KENNINGTON ROAD, S.E

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

SEVENTEENTH SESSION, 1884-5.

The next term will commence on the 7th January, 1885.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. 47 out of 51 Pupils passed the last Examinations.

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In connection with the Westminster College, has been established for the express purpose of preparing for the various examinations of the Pharmaceutical Society students residing in the country, or those unable to attend a School of Pharmacy.

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WITH Chemist or Chemist and Working Dentist preferred. Acquainted some years with Chemist's Retail and Keeping Stock; also 9 months' knowledge of Vulcanite Work. Not afraid of work. Small salary. Good references. R. D. S., 129, St. John's St. Rd., E.C.

AS JUNIOR. Age 23. 7 years' good experience. Height 5ft. 8in. Good references. W. KING, 54, Trinity St., Gainsborough.

AS ASSISTANT. Out-door. Wholesale or Retail. First-class references. For particulars, &c., A. BUXTON, 16, Frias Ter., Stafford.

AS IMPROVER. In-door. 2 years' at business. Passed Preliminary. Age 17. THOS. H. HADEN, 17, Hope St., Barnsley.

LOCUM TENENS. Qualified. By day, week, or month. Town or country. CHEMICUS, 51, Judd St., St. Pancras, W.C.

MINOR qualification. Age 28. Town and country experience. Photograph if required. CHEMIST, Victoria Cottage, Ballater.

AS MANAGER or out-door ASSISTANT. Married. Age 32. Good Prescriber and Counterman. West-end experience. Permanency desired. Speaks French and German. K., 12, Foubert's Pl., Regent St.

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AS IMPROVER, in a good Retail and Dispensing establishment. Country preferred. E. O. A., 33, Broad St., Welshpool, Montgomeryshire.

BY an experienced ASSISTANT. Aged 24. Varied experience and good references. Midland counties preferred. E. ROBERTS, Post Office, Oswestry, Salop.

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AS JUNIOR. London, W, or City preferred. Age 20½. Height 5ft. 9in. Good references. 5½ years' experience. State salary, B., Derwent Bank, Lancaster.

AS ASSISTANT or MANAGER of Branch. Age 25. Married. Permanency preferred. W. H., Threadneedle St., Chelmsford.

LOCUM TENENS. Town or country. Experienced, reliable, and qualified. Disengaged the 4th inst. A good class Retail and Dispensing business preferred. W. TAYLOR, 6, Warbeck Rd., Shepherd's Bush, W.

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AS SENIOR or MANAGER in a good class Dispensing. First-class references and experience. Age 27. Please state full particulars to CHEMIST, Mr. Shepcott, Post Office, Castle Rd., Cardiff.

ENGAGEMENTS WANTED.

AS DISPENSER to Surgeon, or as ASSISTANT to Chemist. Married. Out-doors. Age 29. Minor and Hall. London or country. A. M., 3, Temple St., St. George's Rd., Southwark.

AS Junior ASSISTANT. At liberty in December. City, and out-door preferred. Age 21. 5 years' experience in country and London. PROSPECT, 9, College St., Islington.

BY a gentleman (Ætatis 35), employment for 1 or 2 days a week. Registered. Can Extract Teeth. References unexceptionable. FIDES, Mr. Davis, Chemist, 374, Old Kent Rd., S.E.

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PARTIAL employment, or would execute Mechanical Work at own residence at nearly half the usual charges. J., 14, Queen's Ter., St. John's Wood.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 750.] SATURDAY, NOVEMBER 8, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
Proximate Constituents of Hedyehium Spicatum. By John C. Thresh, D.Sc.	361
The Presence of Oxides of Mercury in Blue Pill and in other Mercurial Preparations. By Harold Senier, F.I.C., F.C.S.	362
Apparatus for Continuous Percolation with Boiling Fluids. By W. Watson Will	363
Standard Dimensions for Percolators. By Oscar Oldburg	364
Menthol Pencils. By A. B. Lyons, M.D.	365
Preparation of Ethereal Salts by Double Decomposition. By G. Bertoni and F. Truffi	366
EDITORIAL ARTICLES AND NOTES :—	
The Society of Apothecaries and the City Companies' Commission	367
Notes :—Proposed Peter Squire Prize in Practical Botany—The Junior Pharmacy Ball and the Benevolent Fund—Chemists' Ball—Pharmaceutical Education in Victoria—Fatal Explosion	368
TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY :—	
Examinations in Edinburgh	369
Meeting of the Council :—	
Election of Associates and Apprentices	370
Reports of Committees	370
Grants from the Benevolent Fund	370
Evening Meeting	373
PROVINCIAL TRANSACTIONS :—	
Midland Counties Chemists' Association	377
Edinburgh Chemists' Assistants and Apprentices' Association :—	
The President's Address	377
Answers to Correspondents	380

CONVERSAZIONE.

OFFICIAL OPENING OF THE SOCIETY'S NEW PREMISES IN EDINBURGH.

The PRESIDENT, VICE-PRESIDENT and COUNCIL of

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Request the honour of the Company of the Members and Associates of the Society at

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Registered Chemists and Druggists desirous of being present, will receive invitations on application to Mr. Peter MacEwan, 36, York Place, Edinburgh.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, December 3rd, 1884, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at half-past 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 26th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

WANTED.—The PHARMACEUTICAL JOURNAL for January 5th, 1884. Full price will be given by the SECRETARY, 17, Bloomsbury Square, W.C.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 5th day of December next, at 12 o'clock precisely.

By order of the Council,

RICHARD BREMRIDGE,
Secretary and Registrar.

October 1st, 1884.

For list of approved Candidates see next page.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

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Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

BENEVOLENT FUND.

APPROVED CANDIDATES.

1.—Braithwaite, Annie Elizabeth. Age 51. Twickenham. Widow of an Annuitant, who was formerly an Associate of the Society, and for thirteen years an Assistant in the Society's Laboratory, and subsequently for sixteen years a teacher of chemistry. Applicant is endeavouring to make a living by letting apartments.

2.—Cooke, John. Age 64. London. A Member of the Society from 1853 to 1877, and subscriber to the Benevolent Fund from 1865 to 1878. Applicant carried on business in London for thirty-six years, but failed through ill-health. He is, from the same cause, quite incapacitated from earning anything. *Second application.*

3.—Davies, Caroline C. Age 56. London. Widow of an Annuitant, who was a Member of the Society from 1842 to 1870, and a subscriber to the Benevolent Fund for twenty-six years. Applicant is in delicate health, suffering from internal disease, and dependent upon her children, who are barely able to maintain themselves.

4.—Davis, Francis. Age 77. Hereford. A Member of the Society and Local Secretary for Leominster from 1841 to 1858. Applicant was in business on his own account at Leominster for twenty-seven years, and retired about twenty-five years ago, but was unfortunate in his investments and lost all his money. His wife, age 60, has about £40 per annum. Applicant's age precludes his obtaining employment.

5.—Fowler, Sarah Anne. Age 64. London. Widow of a registered Chemist and Druggist before August 1st, 1868, who carried on business in London for several years. In 1872 he met with a railway accident (from which he suffered for a period of nine years before his death in a lunatic asylum) but failed to get compensation from the Company. Applicant has partially lost the use of her right hand by accidental poisoning, necessitating the amputation of her fore-finger. She is in very delicate health and is dependent for support upon the charity of friends. *Second application.*

6.—Glynn, Elizabeth Pearse. Age 63. Torquay. Widow of a Member of the Society from 1846 to 1878, when, after an illness of ten years, he died, leaving no provision for his family. He was in business on his own account at Torquay for thirty-three years. Applicant, whose sight is very imperfect, has two daughters, who assist her in letting apartments. Her only son is incapable of work owing to mental weakness, and is dependent upon her for support.

7.—Goadsby, Elizabeth. Age 65. Salford. Widow of a registered Chemist and Druggist before August 1st, 1868, who died in April, 1882. Applicant is quite unable from excessive weakness to do anything to earn her own living. A lady allows her £12 a year, but she has no other means of subsistence.

8.—Johnson, George Thomas Fortin. Age 74. St. Leonard's. A registered Chemist and Druggist before August 1st, 1868. He was in business on his own account for eight years at Norwich, and at St. Leonard's for thirty-seven years, where he failed in 1868. Applicant is dependent upon the charity of friends, and is incapacitated by age from earning anything towards his maintenance.

9.—Read, Robert Elimelech. Age 66. London. An Associate from 1842 to 1845, and a Member from 1875 to 1881. Applicant was in business at Hadleigh, Suffolk, where he failed in 1878. Since then he has been trying to get a living by driving a cab, but his failing eyesight render it difficult for him to continue to support himself in this way.

10.—Sanders, George Lee. Age 73. Tiverton. A Member of the Society from 1841 to 1851, and for some years a subscriber to the Benevolent Fund. Applicant was in business on his own account at Tiverton for forty years, where, in consequence of his age and inability to attend to it, the business gradually fell off and was eventually sold to pay creditors. Applicant has an income of £12 a year.

11.—Stephenson, Thomas. Age 72. Rothwell. A registered Chemist and Druggist before August 1st, 1868. Applicant was in business on his own account at Rothwell for forty-five years, and in 1881 he became paralysed, and can now only get about with difficulty. He is unable to earn anything and is dependent upon his children, who are married and cannot render him much assistance.

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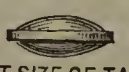

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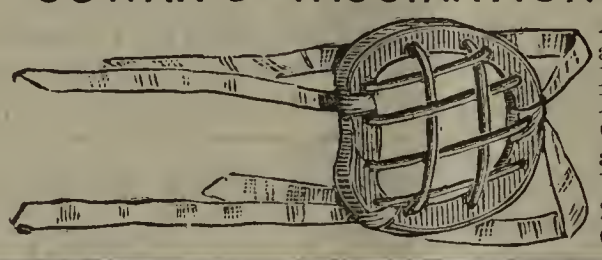

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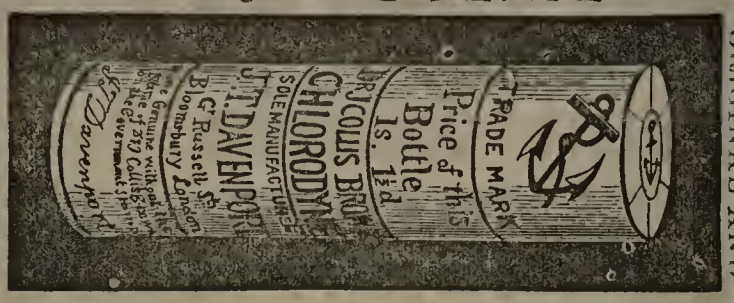

IS THE GREAT SPECIFIC FOR CHOLERA, DIARRHŒA, DYSENTERY.

COUGHS, COLDS, ASTHMA, BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false.*

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

DIARRHŒA, DYSENTERY. GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient. Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

DR. J. COLLIS BROWNE'S CHLORODYNE is the TRUE PALLIATIVE in NEURALGIA, GOUT, CANCER, TOOTHACHE, RHEUMATISM.

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THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

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Allen, Hanbury & Co.	,,	Giles & Son,	Clifton.	Newbery & Sons,	,,
Baiss Brothers,	,,	Goulding, Messrs.	Cork.	Oldham, G., & Co.	Dublin.
Banks & Richards,	Birmingham.	Grattan & Co.	Belfast.	Parsons & Richardson,	Leicester.
Barron, Harveys & Co.	London.	Grimwade, Ridley,	London.	Peake, Allen & Co.	Dublin.
Bell, John & Co.	,,	Grindley & Son,	Chester.	Raimes & Co.	Liverpool.
Corbyn & Co.	,,	Hearon, M'Culloch & Co.	London.	Sang & Barker,	Edinburgh.
Cox & Gould,	,,	Hodgkinson, Tonge & Stead,	,,	Sanger, J., & Sons,	London.
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Drew, B., & Alexander,	,,	Langton, W., & Co.	London.	Sutton, W., & Co.	London.
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Ferris & Co.	Bristol.	Marsden & Sons,	London.	Woolley, James,	Manchester.
Foulger, S., & Son	London.	Maw & Son,	,,	Wyleys & Brown,	Coventry.
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After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

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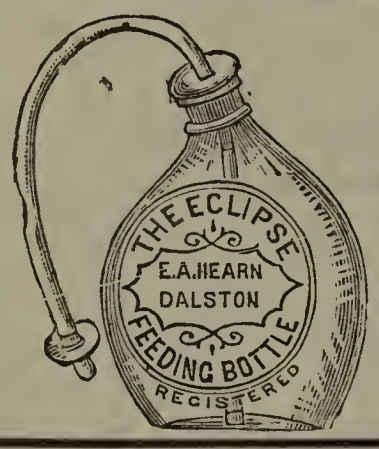

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Lancet, December 18th, 1880:—"This is an excellent preparation of Cocoa and Malt Extract. It is dried at a gentle heat, to avoid injury to the diastase; its dietetic and digestive value is beyond all dispute, and it is very agreeable in flavour."

See also—*British Medical Journal*, Nov. 13th, 1880; *Medical Times & Gazette*, Jan. 1st, 1881; *Medical Press*, Jan. 26th, 1881.

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SUPPLIED BY ALL CHEMISTS.

The popularity of this natural and strongly medicinal remedy is not due to advertising so much as to its own inherent virtues. It is gathered by the honey bees from the horehound honey blossoms.

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Yours very truly, MARIE ROZE.

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What the Clergy say of it.

ELY, CAMBS., *May*, 1883.

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Yours faithfully, JOHN ROBERTS, Jun.

What it did for Geo. F. Black, Esq.

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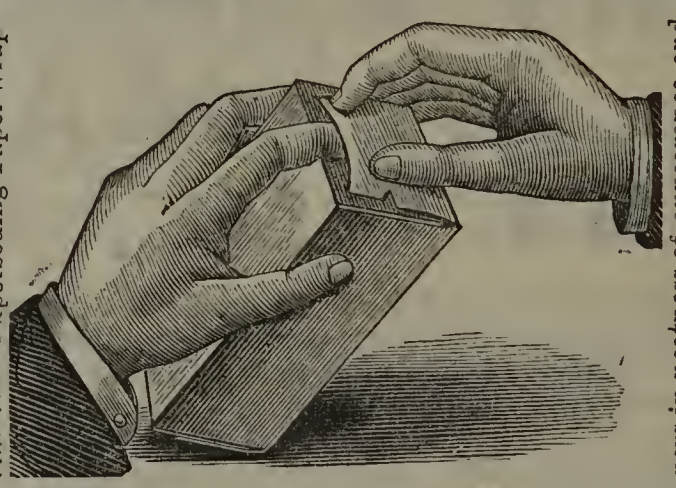

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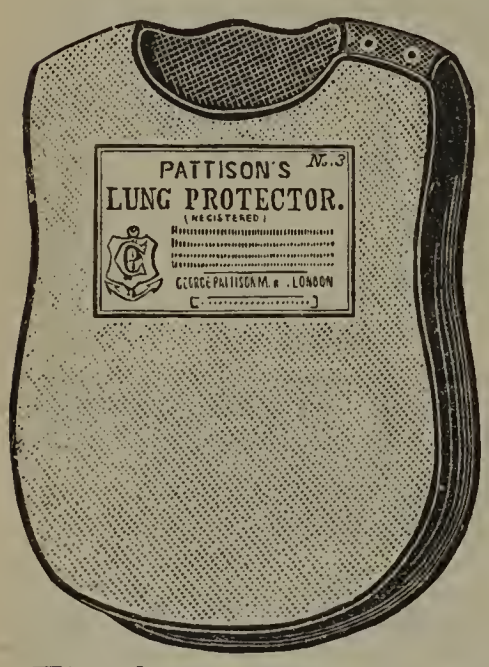

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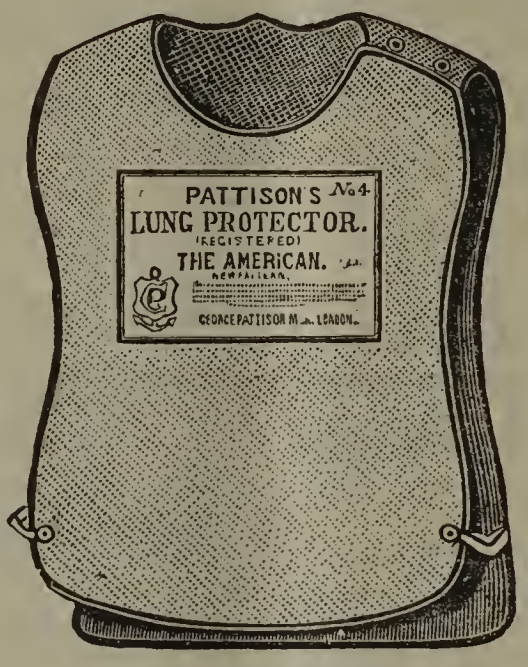

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PROXIMATE CONSTITUENTS OF HEDYCHIUM SPICATUM.*

BY JOHN C. THRESH, D.SC.

This plant belongs to the order *Scitaminece*, and its rhizome, in thin dried slices, is found under the name of Kafur-kachri or Kapur kachri in the bazaars of Hindoostan. It is a native of the Himalayas, and the rhizome, on account of its odour, is used by the Hindoos as incense in worship. Dymock in his 'Veg. Mat. Med. Western India,' describes it and compares its odour to that of orris, "but more powerful and strongly camphoraceous. Taste, pungent, bitter and aromatic." Cooke (*Pharm. Journ.*, Jan. 28, 1871) describes the plant and rhizome. Of the latter he affirms that it consists almost entirely of starch, and the odour, he says, is "never to be forgotten."

The transverse section is white and starchy and exhibits a large central portion, containing scattered minute vascular bundles, and separated by a faint line from the cortical portion, which is also white. Externally the pieces are covered with a tough wrinkled reddish-brown epidermal layer. The taste is aromatic and slightly pungent. The odour may be described as intermediate between storax and rhubarb.

As nothing whatever was known of the proximate constituents of this rhizome, our curator, Mr. Holmes, placed at my disposal his limited supply (about half a kilogram) for a chemical examination. The pieces were mostly circular sections, from $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter and from $\frac{1}{4}$ to $\frac{3}{8}$ inch in thickness, but sometimes consisted of small longitudinal slices.

A small portion was treated successively with various solvents and the extractives were weighed and examined. The odorous principle was entirely taken up by petroleum ether, and this extractive alone appeared worthy of further consideration. Dry ether exhausted the rhizome more readily, but extracted little or nothing not soluble in the petroleum, and as certain constituents of the plant were found to be more readily isolated from the petroleum solution, the whole of the sample was treated therewith.

Upon allowing the petroleum ether to evaporate slowly, an abundant crop of large, colourless, tabular crystals was obtained, together with a pale yellowish-brown oily fluid. These crystals, after washing with cold petroleum, were submitted to a series of recrystallizations in order to remove traces of the odorous matter. They were finally obtained quite odourless, and found to possess the following properties:—Soluble in petroleum ether, ether, alcohol, chloroform and benzol. Insoluble in diluted solutions of potash, soda or ammonia. Sulphuric acid dissolved it in the cold without production of colour, but if heated the solution became purple red. The alcoholic solution was neutral in reaction, not coloured by ferric chloride or precipitated by basic lead acetate. It did not reduce silver salts.

The melting point (uncorrected) was found to be 120–121° F. (49° C.), and after melting it would remain fluid at ordinary temperatures for days if left undisturbed.

Vapour Density.—An attempt to ascertain the vapour density by aid of V. Meyer's apparatus was unsuccessful, as it was found that at the temperature necesssary to vaporize it, dissociation took place.

Combustion.—By burning with copper oxide in a current of oxygen the following results were obtained:—

·2931 gram yielded ·7490 gram CO_2 and ·1804 gram H_2O.

·2703 gram gave ·6912 gram CO_2 and ·1690 gram H_2O.

These results as shown below agree with the empirical formula $C_{12}H_{14}O_3$.

	Found.			
	1.	2.	Mean.	Theory.
C . . .	69·71	69·74	69·73	69·90
H . . .	6·82	6·95	5·88	6·80
O . . .	23·47	23·31	23·39	23·30

Action of Alkalies.—Mixed with melting caustic potash a considerable amount of the substance is volatilized, and complete decomposition of the remainder is difficult to effect. A boiling strong aqueous solution of potash also acts upon it, but very slowly. Dissolved in alcoholic potash and warmed, the solution, if strong, almost instantly becomes filled with minute nacreous crystals; and the whole at once dissolves when diluted with water. Upon distilling the solution nothing but ethyl alcohol was found in the aqueous distillate. The faintly coloured solution left in the flask gave an exceedingly voluminous white precipitate when acidified, and the acid thus separated possessed the following properties:—

Melting Point, 171–172° C. (uncorrected). Soluble in ether and rectified spirit, almost insoluble in cold water, but fairly soluble in boiling water and deposited from the latter solution in acicular crystals. Readily soluble in dilute ammonia, soda or potash, and decomposed aqueous solutions of their carbonates when boiled therewith. Dilute solutions of the soda salt gave a brick-red precipitate with ferric chloride, a white precipitate with silver nitrate, and no precipitate with barium or calcium chloride. Stronger solutions gave precipitates with both these reagents, which made their appearance in a few seconds and were distinctly crystalline. Copper sulphate produced a blue precipitate, becoming paler, green and more voluminous upon boiling.

Combustion:—

·2144 gram yielded ·5316 gram CO_2 and ·1096 gram H_2O.

·2570 gram of the silver salt yielded ·0957 gram Ag.

These results agree fairly with the formula $C_{10}H_{10}O_3$ for the acid, and $AgC_{10}H_9O_3$ for the silver salt.

Salt.	Found.	$C_{10}H_{10}O_3$.
C	67·63	67·42
H	5·69	5·62
O	26·68	26·96

Ag found, 37·24 per cent.; theory requires 37·89.

The per cent. of silver was afterwards determined in a salt prepared from an acid which had been submitted to recrystallization. ·2224 gram then yielded ·0842 gram Ag, or 37·86 per cent., almost exactly the theoretical quantity.

As this acid was the only product of the saponification discoverable in the alcoholic solution, and the formula of the crystalline principle rendered it very probable that it was an ethyl salt of this acid, a small quantity of the crystals was boiled with an aqueous solution of potash in a flask with an inverted condenser until decomposition and solution were effected. The amount of acid thus obtained confirmed this theory, and upon distilling the liquid ethyl alcohol was readily detected in the distillate by Lieben's test, and by the production of aldehyde and

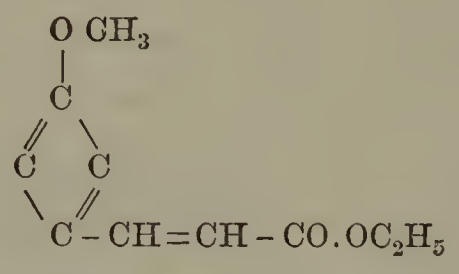
* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, Wednesday, November 5, 1884.

acetic acid by its oxidation. The crystals therefore could be represented by the formula $C_2H_5C_{10}H_9O_3$.

Oxidation with Nitric Acid.—Boiled with dilute (1–3) nitric acid, the crystals dissolved slowly and with evolution of but little nitrous fumes. Upon cooling, the whole nearly solidified into a mass of delicate acicular crystals, which were removed, washed and dried. This acid was slightly soluble in cold water, more freely in boiling, melted at about 180° C., volatilization commencing a few degrees lower. The whole of the reactions showed it to be anisic acid, a conclusion confirmed by the estimation of the silver in its silver salt.

·0904 gram yielded ·0374 gram silver, or 41·37 per cent. Anisate of silver yields theoretically 41·70 per cent. of metal.

Anisic acid, $C_8H_8O_3$, being methylparaoxybenzoic acid, the acid $C_{10}H_{10}O_3$ is doubtless methylparaoxyphenylacrylic, or methylparacoumaric acid, and its ethyl salt will have the formula represented below.



Methylparacoumaric acid has been prepared by Perkin by the action of acetic anhydride on anisic aldehyde in presence of sodium acetate, and appears to be identical with the acid obtained from the *Hedychium spicatum*, so far as the very small quantity at my disposal allowed me to proceed with the verification. I am not aware of the ethyl salt having previously been described, nor of either of these bodies having been found before in the vegetable kingdom.

As I purpose continuing my search for the odorous principle on receipt of a fresh supply of the rhizome, which is now on its way from India, the opportunity will be afforded for making such further examination of the two bodies just described as may seem desirable.

The Uncrystallizable Portion of the Petroleum Ether Residue.—This was found to consist of the odorous principle, a fixed oil and a very considerable proportion of ethylmethylparacoumarate, the latter doubtless prevented from crystallizing by the presence of the former. Upon saponification of the mixture with alcoholic potash, two crystalline acids were obtained, the methylparacoumaric and another, apparently a fatty acid. This latter was totally insoluble in boiling water, but crystallizable from alcohol. The quantity obtained did not enable me to identify it with certainty, and its further examination is reserved for the immediate future.

The odorous principle evidently exists in the rhizome in very minute proportion, and to isolate it in a state of purity will necessitate working on a much larger quantity of material.

A very minute quantity of the oily fluid above mentioned dropped upon the clothes renders them highly odorous for a considerable length of time, or if exposed causes a large room to be pervaded with its odour, which to me recalls that of hyacinths.

The proximate analysis of the rhizome gave the following results:—

Soluble in petroleum ether—		
Ethylmethylparacoumarate	3·0	5·9
Fixed oil and odorous body	2·9	
Soluble in alcohol—		
Indif. substance ppt. by tannin Acid resin, etc.		2·7
Soluble in water—		
Glucoside or saccharine matter		1·0
Mucilage		2·8
Albuminoids, organic acid, etc.		1·9
Starch		52·3
Moisture		13·6
Ash		4·6
Cellulose, etc.		15·2
		100·0

[*The discussion on this paper is printed at p.* 373.]

THE PRESENCE OF OXIDES OF MERCURY IN BLUE PILL AND IN OTHER MERCURIAL PREPARATIONS.*

BY HAROLD SENIER, F.I.C., F.C.S.

My attention has just been called to a paper by Messrs. Dechan and Maben on "The Strength and Condition of Commercial Specimens of Hydrargyrum cum Cretâ, Pilula Hydrargyri and Unguentum Hydrargyri,"† read at the Hastings meeting of the British Pharmaceutical Conference. This paper is an attempt to further elucidate the question of the existence or non-existence of oxides of mercury in these preparations, and gives the results of the examination of some commercial samples of each of them, including an estimation of the metallic mercury and the two oxides. The results obtained by Messrs. Dechan and Maben may be summarized as follows:—In hydrargyrum cum cretâ they find a considerable proportion of oxides of mercury, in one sample as much as 6·15 per cent. of mercurous oxide and 2·8 per cent. of mercuric oxide. In pilula hydrargyri, out of eight samples examined, in six they failed to find any trace of oxides, although one mass was four years old. In unguentum hydrargyri, out of twelve samples examined, in two only was oxide found, and in these only a very small percentage. These results are so materially opposed to those obtained by myself in an investigation of the same subject as to indicate an error on the part of one of us, either in method or experiment. This is particularly the case in regard to pilula hydrargyri, the results of my examination of which I recorded in a communication to the Pharmaceutical Society in February, 1876.‡

The method adopted by Messrs. Dechan and Maben for the estimation of the oxides of mercury is to digest the substance under examination in hot or boiling acetic acid, and after washing the residue with the same menstruum to treat the acid solution, supposed to contain the two oxides as acetates, first with hydrochloric acid to precipitate mercurous chloride, and then with sulphuretted hydrogen to precipitate mercuric sulphide. From the weight of these salts, after drying, is calculated the amount of oxides present in the sample.

The method which I have used for the estimation of the oxides in the pharmacopœial preparations of mercury is first to digest the sample in hydrochloric

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, Wednesday, November 5, 1884.

† *Pharmaceutical Journal*, Series iii., No. 743., p. 230.

‡ *Pharmaceutical Journal*, Series iii., No. 293, p. 621.

acid to dissolve the mercuric oxide; to this solution, after neutralizing excess of acid with ammonia, stannous chloride is added and the reduced metallic mercury separated, dried over sulphuric acid and weighed; from this weight is calculated the amount of mercuric oxide present. To estimate the mercurous oxide a fresh portion of the sample is digested in a 5 per cent. solution of hydrocyanic acid, which converts the mercury of the mercuric oxide into mercuric cyanide and also so converts half the mercury of the mercurous oxide, leaving the remainder as metallic mercury. The hydrocyanic acid solution is treated with stannous chloride, in the same manner as the hydrochloric acid solution, and from the weight of metallic mercury obtained the weight of mercury existing as mercuric oxide is subtracted, and the remainder doubled, this result calculated into mercurous oxide gives the quantity present in the sample. This method for the estimation of mercurous oxide is based on some observations of Scheele on the action of hydrocyanic acid on oxides of mercury, and is more fully described in my paper on "The Composition of Pilula Hydrargyri" (*Pharm. Journ.*, February 5, 1876). In that paper I gave the results of the examination of nine commercial samples of pilula hydrargyri, the oxides in which were estimated by the method I have just described. In each case, with one exception, the age of the sample was determined as accurately as possible. The age of the samples varied from eighteen hours to two years, and the percentage of oxides from a trace to 1·80 of mercuric oxide, and from ·25 to 4·22 of mercurous oxide. The proportion of oxides present bore such a striking relation to the age of the samples as to lead me to the conclusion that the proportion of oxides increases with the age of the sample, and that machine-made masses oxidize more rapidly than those made by hand.

After trying Messrs. Dechan and Maben's method on some commercial samples of pilula hydrargyri, and failing to find but a trace of oxides in them, while by the method which I had formerly used I found distinct quantities, I decided to try the two methods on a sample containing a known quantity of one of the oxides. As mercurous oxide exists in mercurial preparations to a much greater extent than mercuric I considered it the most suitable for the purpose, and after preparing a fresh sample of pilula hydrargyri I added to it 5 per cent. of freshly precipitated mercurous oxide, and submitted portions of this mass to a careful analysis by the method employed by Messrs. Dechan and Maben, and by the hydrocyanic acid method I have described. The results were—

Hydrocyanic acid method . .	4·72 p.c. $\frac{1}{2}Hg_2O$.
Messrs. Dechan and Maben's method	·250 „ „

Although there is no doubt more than one source of error in the process of Messrs. Dechan and Maben which contributes to this result, there can be little doubt that the most important one is the instability of mercurous acetate in presence of organic matter, especially glucose, it being rapidly reduced even at ordinary temperatures to oxide, a change which would be still more readily brought about by hot digestion. In support of this explanation of the opposite results obtained by Messrs. Dechan and Maben and myself is the fact that in hydrargyrum cum cretâ, a preparation free from organic matter and which, in my experience, is less liable to oxidation than pilula hydrargyri or unguentum hydrargyri, their process gives results coinciding very closely with my own and those of other workers on the same subject.

When I completed my examination of blue pill in 1876 I preserved samples of each mass analysed, and thinking the present opportunity a fitting one, I have again estimated the quantity of oxides in one of these samples which eight years ago contained ·24 per cent. of mercuric oxide and ·62 per cent. of mercurous oxide, but which I now find to contain 1·20 per cent. of mercuric oxide and 3·62 per cent. of mercurous oxide, thus affording another proof of the theory that the oxides of mercury, which undoubtedly exist in all samples of pilula hydrargyri, increase with the age of the sample.

[*The discussion on this paper is printed at p.* 374.]

APPARATUS FOR CONTINUOUS PERCOLATION WITH BOILING FLUIDS.

BY W. WATSON WILL.

In the issue of the *Pharmaceutical Journal* of the 11th October there is a description of an apparatus for continuous percolation, by Dr. Thresh, which is evidently an improvement upon the apparatus originally used by Tollens for the same purpose, the difference between the two apparatus consisting in the arrangement of the percolating tube; otherwise in principle they are the same.

In examining Dr. Thresh's apparatus I came to the conclusion that unless such an apparatus were employed in the hands of a skilful operator there is a considerable liability that the fine tube, with curved apex, would be broken in packing the substance for exhaustion; also that to make a punted and perforated tube such as he describes requires a considerable amount of skill. Otherwise it has the advantage over Tollens' apparatus, that through the centre of the substance there would pass a constant current of the vapour of the solvent by means of the fine tube, by which means the substance under examination is quickly heated throughout the mass.

I have used for some considerable time an apparatus much similar, but simpler in its construction, for the estimation of cinchona barks, scammony, etc. It consists of the following parts:—

(1). An ordinary flask, with a long narrow neck, and fitted with a perforated sound cork, or india-rubber stopper.

(2). A half-ounce glass syringe, having its lower end stopped by a small plug of cotton wool; the upper end is closed by a perforated cork, through which passes the pointed end of the condensing tube, thus fixing the two tubes firmly together.

(3). A long glass tube pointed at one end and having a small hole made near the pointed end to admit of the inflow of the vapour to be condensed.

(4). Another, but wider glass tube, drawn out at one end, so as to admit of a perforated cork, through which passes the upper limb of the condensing tube. Near the lower end of this tube a small hole is made, into which is fixed a narrow glass tube, to which is attached a piece of india-rubber tubing, and if necessary closed by a clamp.

The working of the apparatus is very simple. Having placed the substance to be exhausted in the tube 2, the condensing tube is now firmly fixed into position and the liquid used for exhausting is

poured down the tube. A current of cold water is now allowed to flow into tube 4, this being regulated by means of the clamp. Heat is now applied to the flask, when the vapour passes up and enters tube 3, where it condenses in the upper limb and flows back into the percolator.*

STANDARD DIMENSIONS FOR PERCOLATORS.†

BY OSCAR OLDBERG.

All the ready-made percolators obtainable in the United States market up to this time are absurd as to their proportions, and should be discarded as soon as percolators of proper form and dimensions can be found. They are much too short in proportion to their diameter; a glass percolator 17 inches in length being 10 inches in diameter at the top, when it ought to be about 3 inches. They are generally of very irregular form, and instead of being very slightly conical, they are either perfectly cylindrical or as tapering as a sugar loaf. In most of them the tops are so irregular that they cannot be covered tightly when desired. Their stems are badly shaped and of too small bore, so that it is frequently difficult and sometimes impossible to insert the cork.

The object of this paper is to present in a concise manner the practical lessons taught in our extensive literature on percolation, so far as relates to the apparatus, and to suggest how we may utilize these lessons. I propose to summarize the conclusions to be derived from the able and exhaustive studies of Dr. Squibb, Professors Diehl, Lloyd, Remington and others, which agree with my own experience. There will be nothing new, therefore, in the propositions here submitted; but I feel that a service will be performed by placing them together so that they may be reviewed with ease:—

1. Simple percolation is on the whole the best form in the hands of pharmacists operating on a small or moderate scale, being easier and safer, and yielding, when the official directions are followed, more uniform results. Re-percolations or fractional percolation can be profitably carried out only on a comparatively large manufacturing scale. Simple percolation is accordingly the process to which preference has been given in the Pharmacopœia of the United States of America.

2. Simple percolators, when properly constructed and used, are decidedly preferable to any patent apparatus with which I am acquainted, both in point of economy and efficiency.

3. Tall and narrow percolators—considerably taller in proportion to their diameter than any heretofore obtainable in the market—are necessary to insure the proper exhaustion of the drug with a moderate quantity of menstruum, simple percolation being the process followed.

4. As the sole object of using a tall and narrow percolator is to increase the height of the column of drug and menstruum in proportion to their mass, it is evident that, in using any percolator, it is necessary to pack it as nearly full as practicable, leaving only just enough space at the top to enable the adding of menstruum as required.

To use a tall and narrow percolator, packing it only half full, is of course equivalent to using a short percolator.

5. It is, therefore, an imperative rule that, instead of making a certain fixed quantity of fluid extract or tincture, or other percolate, without sufficient regard to the size of the apparatus available for the operation, we must invariably adjust the quantity of drug to suit the percolator. Thus, if the percolator is large enough for 17 or 18 troy ounces, it is wrong to put only 16 troy ounces in it.

6. From these conclusions it follows, further, that a sufficient variety of sizes of percolators must be found in the shop or laboratory of every pharmacist who has the commendable ambition to make his own fluid extracts and tinctures. For each percolate he wishes to make he must have a percolator large enough to obviate any necessity for using it too many times in order to obtain a sufficient quantity of product, and at the same time sufficiently small to enable him to fill it without obtaining a greater quantity of product than he can use.

7. There are not now in the market any percolators which reasonably fulfil the requirements necessary to enable the pharmacist to conveniently carry out the official directions for percolation under circumstances favourable to satisfactory results.

These considerations led me to adopt a set of fixed dimensions for percolators, such as are, in my opinion, most suitable for general use in the preparation of fluid extracts and other preparations in accordance with the excellent details of manipulation given in the latest revision of the Pharmacopœia of the United States (pp. xxxvi. and xxxvii.). These dimensions have been adopted by the Chicago College of Pharmacy for the percolators to be used in its new pharmaceutical laboratory, and are herewith presented in tabular form.

Standard Percolators of the Chicago College of Pharmacy.

Sizes.	Approximate capacity.		Length of body.		Internal diameter at the top.		Internal diameter of body at the shoulder.		Depth of shoulder.		Length of stem (or neck)		Internal diameter of stem at the throat.		Internal diameter of stem at mouth or exit.		Length of rubber tube.	
	C.c.	U. S. fl. measure.	Mm.	Ins.	Mm	Ins.	Mm.	Ins.	Mm	Ins.	Mm.	Ins.	Mm.	Ins.	Mm.	Ins.	Mm.	Ins.
1	90	3 fl oz	150	5·09	30	1·181	25	·984	4	·157	30	1·181	10	·394	12	·472	200	7·87
2	150	5 „	180	7·09	36	1·417	30	1·181	6	·236	30	1·181	10	·394	12	·472	240	9·45
3	240	8 „	210	8·27	42	1·654	35	1·378	8	·315	30	1·181	10	·394	12	·472	280	11·02
4	360	12 „	240	9·45	48	1·890	40	1·575	10	·394	30	1·181	10	·394	12	·472	320	12·60
5	530	18 „	270	10·63	54	2·126	45	1·772	12	·472	35	1·378	13	·512	15	·591	360	14·17
6	740	25 „	300	11·81	60	2·362	50	1·968	14	·551	35	1·378	13	·512	15	·591	400	15·75
7	1,240	42 „	360	14·17	72	2·835	60	2·362	16	·630	35	1·378	13	·512	15	·591	480	18·89
8	1,960	66 „	420	16·53	84	3 307	70	2·765	18	·709	35	1·378	13	·512	15	·591	560	22·05
9	3,000	100 „	480	18·89	.96	3·780	80	3.150	20	·787	35	1·378	13	·512	15	·591	640	25·20
10	3,780	8 pts.	540	21·25	108	4·252	90	3·543	22	·866	35	1·378	13	·512	15	·591	720	28·35
11	5,700	12 „	600	23·62	120	4·724	100	3·937	24	·945	35	1·378	13	·512	15	·591	800	31·50
12	7,600	16 „	660	25·98	132	5·197	110	4·331	26	1·024	35	1·378	13	·512	15	·591	880	34·65
13	9,850	21 „	720	28·35	144	5·670	120	4·724	28	1·102	35	1·378	13	·512	15	·591	960	37·80
14	12,500	26 „	780	30·71	156	6·132	130	5·118	30	1·181	35	1·378	13	·512	15	·591	1040	40·05

* See a description of a similar apparatus by Mr. White on p. 37.

† Read at the meeting of the American Pharmaceutical Association. Reprinted from the *American Druggist*, October, 1884.

That the best proportions for practical work, all things considered, cannot be determined with exactness, is obvious. I believe, however, that the dimensions adopted by the Chicago College of Pharmacy will be found as nearly right as it is practicable to make them. The percolators are tall and narrow enough to insure very satisfactory results, and not so tall as to be awkward.

The only additional implements required are a proper stand to firmly support the percolator in position; a wooden plunger made of a circular disk of hard wood fixed on the end of a piece of broom stick; a piece of sheet rubber ($\frac{3}{8}$ inch thick), or a piece of plate glass, or of wood, to be used as a cover; a receiving bottle, and a few blocks of wood with which to raise or lower the receiving bottle to regulate the rate of flow during the percolation.

A perforated rubber stopple, 25 millimetres (1 inch) long, slightly tapering, and of the right diameter to fit the stem of the percolator, is better than an ordinary cork for carrying the exit tube to be inserted in the stem. The glass tubing used should be of about 6 millimetres ($\frac{1}{4}$ inch) external, and 3 millimetres ($\frac{1}{8}$ inch) internal diameter. The exit tube should be 5 centimetres (2 inches) long, thus protruding 25 millimetres (1 inch) beyond the larger or outer end of the rubber stopple or cork, the other end of this tube being flush with the smaller end of the cork. The rubber tube should be 5 millimetres ($\frac{1}{5}$ inch) internal diameter. The drop tube (glass) at the further end of the rubber tube may be the same length as the exit tube (5 centimetres). These dimensions of cork and tubing will answer for any size of percolator. The length of the rubber tube, however, must be nearly one-third greater than the height of the percolator in each case respectively.

It will be observed that the total depth of each percolator is uniformly five times its large diameter, and six times its small diameter. These percolators, are, therefore, very nearly cylindrical.

The tops are ground off and thus capable of being tightly covered.

The stem is a regular tincture bottle neck, with the internal diameter greater at the mouth than at the throat, thus admitting insertion of the rubber stopple or cork from without instead of from within. In the old percolators the stem or neck is wider above than below, and hence the Pharmacopœia directs that the cork be inserted from within, which is very inconvenient.

The stem of the new percolators is long enough to properly accommodate the plug of loose cotton to be inserted over the cork. "Absorbent cotton," or any clean, dry, loose cotton, will answer. The sand used must be very coarse, all the fine dust having been sifted and washed out of it, and must be perfectly dry when used. The layer of sand should not be too thick.

Conical percolators are in my experience not required for any drug. The new percolators proposed are sufficient for all purposes, provided the general official directions are followed with a reasonable amount of intelligence and discretion. It is important that the moistened drug shall be permitted to remain loosely shaken together in the percolator sufficiently long to become thoroughly permeated by the moisture before being packed, and that the subsequent packing be done with care and with the requisite degree of relative firmness. The packed mass pushes upward when swelling takes place, and when a conical percolator is used the consequence is that a space is formed all around between the drug and the inner surfrce of the percolator, necessitating constant watching and mending. This evil is largely avoided in cylindrical percolators.

MENTHOL PENCILS.*

BY A. B. LYONS, M.D.

Although but recently introduced into the United States the crayons or pencils of menthol, that have proved in Europe so efficient a remedy for headache and neuralgias, have become extremely popular, and are now presented by various manufacturing firms in a great variety of forms, and, as it appears, at widely varying prices. While it is true that sharp competition in trade frequently depresses prices temporarily to a point where the margin of profit becomes a vanishing quantity, it can hardly happen that an article which is offered at a figure apparently considerably below cost, can be actually what it purports to be. I have had the curiosity, therefore, to examine a few of the menthol pencils which, under one name or another, are at present bidding for popularity, especially those setting forth as the argument likely to have the greatest weight with dealers, their cheapness as compared with similar articles already on the market.

The results of this examination have proved so interesting that I have thought it worth the while to place them on record. Some specimens were examined which were found unexceptional in quality, which still might be criticized on the ground that they offered the purchaser so much case with so little menthol. In one instance nearly half the menthol was wasted, for practical purposes, in filling up the socket of the holder; the pencil weighed 25 grains, but the portion available for use weighed barely 15 grains.

Of the samples selected as worthy of special note, No. 1 may be accepted as a representative specimen of an honestly made article, and may serve as a foil to those that follow.

Sample I.—Case turned, of wood, in the form of an acorn, the cover fitted by a screw thread cut in the wood. Weight of menthol pencil or cone, 30 grains, at least 25 grains of which are available for use. The pencil has a highly crystalline texture, and produces no greasy sensation when applied to the skin. Fusing point of the material of the pencil 109° F. (42·75° C.). Completely soluble in alcohol. Volatilizes completely in a short time at a water-bath heat. Odour of pure menthol.

Sample II.—Case ellipsoid in form, one half made of a resinous composition made to imitate marble, the other (cover) made of pewter or some similar alloy. A portion scraped from the surface of the pencil proved to be pure menthol. When the pencil was cut off, however, at the base, it was found that it contained a core of paraffin wax, with which substance the deep socket of the case was filled. There would obviously be no use in filling this socket with menthol, and the paraffin commends itself as being at once light and cheap. The paraffin, however, projects in a form similar to that of the tip of a wax candle, 6 or 8 millimetres above the socket, so that the pencil which from its apparent size should weigh as much as 20 grains, weighed in fact less than 12. What there is of the menthol, however, is of good quality.

Sample III.—The case is of wood, but cheaply made, having the form of an acorn, but made more slender than No. 1, of which it is evidently an imitation. The pencil is very small and slender, weighing only 15 grains. The colour is pure white, without the crystalline appearance characteristic of menthol, but rather resembling polished marble. To the touch it gives a distinctly greasy impression. It is homogeneous in character. A portion taken from the surface refuses to melt until the temperature is raised to nearly 130° F. (54·8° C.). It is only partially soluble in strong alcohol. By exposure a short time to a water-bath heat it was reduced in weight 30 per cent., and had then no longer any odour of menthol. The residue in fact was simply paraffin wax. The pencil therefore contains not more than $4\frac{1}{2}$ grains of menthol, and that largely diluted with paraffin. These crayons surely should be sold cheap.

Sample IV.—Case turned of wood in the form of an elongated truncated cone. Weight of the contained pencil about 21 grains. The pencil is similar in appearance to that just described, and identical in composition with that, except that the manufacturers have been more lavish with their paraffin, of which they have used the

* From the *Therapeutic Gazette*, October, 1884

extravagant proportion of 80 per cent. The "pencil," although not of such dainty proportions as in No. III, contains even less menthol, the quantity not exceeding 4¼ grains.

Sample V.—This proved the most interesting of them all. The material of the box is horn, and the label claims nothing in regard to the composition of the pencil, which is represented to be simply the Chinese headache cure.

The pencil had a weight of about 20 grains, and was of a pure snowy white colour, having in a high degree the crystalline appearance so characteristic of pure menthol. The odour, however, was more rank than that of the genuine Japanese menthol, reminding one rather of common oil of peppermint. This would indicate that the menthol was that procured from the oil of *Mentha piperita*, Lin., and that it was probably of American manufacture. The imported menthol obtained from *Mentha arvensis*, Lin., var. *piperascens*, has an odour similar to that of the oil of peppermint, but having a quality which can only be described as purity, in the sense in which that word is used of colours and musical tones, and this purity of odour seems to point directly to purity in the chemical sense in the substance possessing it.

Menthol prepared from oil of peppermint has been found to have a low fusing point. I was surprised therefore, to find that a portion of this pencil when exposed to a gradually increasing temperature showed no sign of melting at 110° F. (43·3° C.), that even at 113° F. (45° C.) there was no change except that the surface became glistening as though moist, but complete fusion did not take place even when the temperature was raised to the boiling point of water.

Alcohol did not readily dissolve the whole of this material, although it rapidly disintegrated it, a crystalline substance remaining diffused through the spirit, in which it slowly dissolved.

A portion of the pencil was exposed for a few minutes to a full water-bath heat; the odour of menthol soon disappeared completely, but there remained a considerable crystalline residue, which proved to be readily soluble in hot water, yielding a bitter solution neutral in reaction. The solution gave no precipitate with Mayer's reagent. A little of the powder placed on platinum foil and heated, first melted, then began to give off fumes of a peculiar aromatic odour, then darkened, took fire, and was completely consumed. The behaviour of the substance was precisely that of salicin, and further tests demonstrated that it was nothing else. The proportion of this substance present in the pencil proved to be about 30 per cent. There was, therefore, not more than 14 grains of menthol in the pencil.

The selection of salicin as an adulterant for menthol shows genius. The crystalline appearance of the pencil would induce one to "pass" it at a glance as pure menthol, and few persons would think of looking for a substitute so unlike menthol in testing the pencils. An attempt, however, to determine the fusing point of the material or its solubility in alcohol at once reveals the presence of some adulterant, and the fact of adulteration, rather than the precise nature of the adulterant is what the experimenter generally is interested to know.

It is a simple matter in most cases to ascertain whether or not a menthol pencil is genuine. If a little of the material is scraped from the surface and placed on a watch crystal or slip of glass which has been dipped previously in water having a temperature of 115° F. (46° C,), it should melt at once. The exact melting point can be determined with a little trouble, by placing the material in a small glass tube closed at the lower end, and immersing this, together with the bulb of an accurate thermometer in water, the temperature of which is then gradually raised until the material shows signs of fusion. Pure menthol will melt at a temperature between 107° F. (41·7° C.) and 110° F. (43·3° C.). The most frequent adulterant is paraffin wax, which melts at a much higher temperature, but many mixtures will be found to melt at a lower temperature, and it is, of course, possible to produce one which will coincide precisely in its melting point with the pure menthol.

The second experiment, which will generally be conclusive, consists in heating the watch crystal containing the menthol to about 212° F. (100° C.) until the odour of menthol entirely disappears. If the menthol is pure, there will of course be no residue. All the adulterants that have hitherto been employed are non-volatile substances, and will therefore remain on the watch crystal, when their identity will generally be at once manifest.

Salicin will of course be easily recognized by its solubility in water, its bitterness, and the red colour it assumes when touched with strong sulphuric acid.

The solubility of the "menthol" in alcohol is an additional test of some value. Pure menthol dissolves rapidly and completely; many of the substances employed as adulterants are either insoluble or dissolve slowly and with difficulty.

PREPARATION OF ETHEREAL SALTS BY DOUBLE DECOMPOSITION.*

BY G. BERTONI AND F. TRUFFI.

Bertoni had previously found (*Gazetta*, 1882) that when amyl nitrite is digested with ethyl or methyl alcohol double decomposition takes place with formation of ethyl or methyl nitrite and regeneration of amyl alcohol. The authors in this paper give the results obtained with normal propyl alcohol (b. p. 97°) and isobutyl alcohol (b. p. 107°). The amyl nitrite employed was prepared from fermentation amyl alcohol boiling between 128° and 132°.

Propylic Nitrite.—Amyl nitrite and propyl alcohol in molecular proportions were placed in a flask furnished with a four-bulb fractioning tube, and gradually heated, collecting the portion which came over below 64°; this, after being dried with fused calcium nitrate and submitted to fractional distillation, gave pure propyl nitrite (b. p. 57°), which was subsequently completely reconverted into propyl alcohol by digestion with methyl alcohol. It was found that 51·6 per cent. of the propyl alcohol was converted into the nitrite.

Isobutyl Nitrite.—On heating a mixture of amyl nitrite and isobutyl alcohol in the manner described above, isobutyl nitrite was obtained boiling at 66–70°, the proportion of the alcohol converted, however, being only 37·8 per cent. in this instance. Several repetitions of these experiments were made, and from the results and those obtained in the former research, he deduces the following:—

Limit of the Formation of Nitrites by Double Decomposition.

Methyl alcohol	=	100	per cent.
Ethyl „	=	85	„
Propyl „	=	52	„
Isobutyl „	=	37	„

The limit of etherification decreases with the molecular weight, and moreover this decrease is regular, for if we consider the difficulty of separating the whole of the propyl and isobutyl nitrites formed, it is more than probable that the numbers found are somewhat too low: if we make that for propyl alcohol 55 and for isobutyl alcohol 40, the limits become 100, 85; 55 and 40 per cent. respectively, and the differences $100-85=15$; $85-55=30=2\times15$; and $55-40=15$. The author also draws attention to the fact that the differences between the boiling points A of the alcohols, and of the corresponding nitrites B, is in almost every case 40°.

* From *Gazetta*, xiv., 23–29. Reprinted from the *Journal of the Chemical Society*, November, 1884.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 8, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelop s indorsed "Pharm. Journ."*

THE SOCIETY OF APOTHECARIES AND THE CITY COMPANIES COMMISSION.

THE two bulky volumes issued during the past week, as an appendix to the report of the City of London Livery Companies Commission, contain not only a mass of materials to assist in the formation of a judgment as to what should be the future of the bodies in question, but also a wealth of information of considerable antiquarian interest. The returns made by the different Companies throw a flood of light upon the evolution and development of various trades and callings, more than one of which have been at one time or another associated with the art of medicine. First among the "minor" companies — alphabetically — stands the Apothecaries' Company, or Society of Apothecaries, as it appears to prefer to be called, the first charter of which was granted in 1617 by JAMES I. Before that time apothecaries had a place in the Company of Grocers, which boasts of a much higher antiquity, it having been originated as far back as 1345 by some members of the "gild of pepperers," who appear to have contemplated the establishment of a confraternity with social, benevolent and religious objects, under the patronage of ST. ANTHONY. Although not specially mentioned, trade, however, was not excluded, for within twenty years a complaint was made to the King, which might find endorsement in the present day, that "les marchantz nomes grossers engrossent toutes maneres de marchandises vendibles." The trade element soon becoming more openly recognized, the term "grosser" or "grocer" was first applied to the company in 1375, after which the name "Fraternity of St. Anthony" was dropped. About this time the practice sprung up of "garbelling," *i.e.* the cleansing or examining of spices, drugs, etc., to detect and prevent adulteration, and this appears to have fallen into the hands of the grocers, for in 1447, the Company, which had meanwhile become incorporated, received by letters patent from HENRY VI. the exclusive right of "garbelling" throughout all England, except in the City of London. The grounds for making this grant, as stated in the charter, were that it would be to the advantage of loyal subjects that "all "sorts of spices and merchandises, as well annis, "cummin, wormseed, wax, allum, kermes as "pepper, ginger, cloves, mace, cinnamon, rhubarb, "scammony, spikenard, turpentine, senna, almonds, "dates, rosin, treacle, electuaries, syrups, waters, "oils, ointments, plaisters, powders, and all con- "serves and confections, as green ginger, succade, "cardamums and all sorts of merchandises, spices "and druggs in any wise belonging to medicine," should be duly and justly supervised, garbelled, searched, examined and proved by "officers skilled in the premises of this kind," to the intent that no subject should in future be deprived of benefit in buying any of the aforesaid articles, "nor by the buying of these kind be in any wise hurt in their bodily health." The activity of the Company in this direction is shown by the records of various fines and condemnations, and in 1562 it ordered that the "apothecaries, freemen of the Company," should not use or exercise any drugs, simple or compound, "or any other kynde or sortes of poticarie wares but such as shall be pure and perfyt good." But the Company was able to do more than issue orders, for in 1607 it received powers to punish delinquents unduly or insufficiently carrying on or exercising the mystery or art of grocer or of an apothecary. In virtue of these powers, seven years afterwards, an apothecary and brother of the Company, convicted by the Court of Assistants of selling "to the Prince his highness's apothecarie ". . . apothecarie wares which on trial were found "to be defective corrupt and unwholesome for man's "body," and the apothecary being also found "very unfitt in making of compositions and confections, and insufficient and unskillfull to deale therein," he was committed to the Poultry Compter.

But a process of differentiation or evolution that had been in progress for some time, first becoming manifest in the use of the name "apothecary" to signify a section of the Company of Grocers, soon afterwards attained its logical sequence, and in 1617, at the desire of the apothecaries, they were dissociated from the grocers and constituted by charter an independent body. The first object of the charter was to restrain members of the Grocers' or any other City Company from keeping an apothecary's shop, or exercising the art, faculty or mystery of an apothecary within the City of London or an area of seven miles, and "that the ignorance and rashness of "presumptuous empirics and ignorant and unexpert "men may be restrained whereupon many discom- "modities, inconveniences and perils do daily arise to "the rude and incredulous people." Evidently the apothecaries of that day were not squeamish about fouling the nest they no longer required to use. In addition, the charter gave the new Society power to prevent any person who had not served an apprenticeship of at least seven years to an apothecary and been afterwards approved by the College of Physicians from keeping an apothecary's shop, or preparing, dispensing, commixing or compounding medicines; also the right of search for unwholesome

drugs in the shops of apothecaries or others, as well as liberty to "buy, sell or make drugs." The process of evolution continued, or, in the words of the return in regard to the three first-stated powers of the Charter, the Society "extended them so greatly as to "effect not only a revolution in its own sphere of "operations, but also in the medical profession and in "the relations subsisting between the latter and the "general public." The outcome was the Apothecaries Act of 1815, under which the Society of Apothecaries was legally recognized as a medical corporation and the descendants from the *quondam* "pepperers" and "grossers" received powers to examine and grant licences to practise medicine. Under these circumstances some points in the constitution of this licensing body are not without interest. Freedom of the Company, we are told, is attainable in three ways: by patrimony, by apprenticeship, and by purchase. At the date of the return there were four hundred members of the Company, two hundred and fifty being "freemen" and one hundred and fifty "liverymen." Of these a small number were apothecaries before the passing of the Act of 1815, and about six had taken up their freedom by patrimony who were not actually apothecaries. It appears that some doubt has been expressed whether any but apothecaries can legally be members of the Company, but it is stated that the question has never received a legal decision, probably, it may be added, for a sufficient reason. It may also be remarked that the evidence given before the Commission upon the point of freedom by patrimony can hardly be reconciled with the statements made in the returns. The governing body of the Society is the Court of Assistants, consisting of twenty-four members, the qualification for the office being membership of the Society, though usually the "Assistant" is a liveryman of fifteen years' standing. The duties of the Court are numerous and varied, but it need only be mentioned here that they include the election and swearing in of examiners and the management of the botanic garden at Chelsea.

Contrary to what might have been expected the duties performed by the Society in the public behalf, although undoubtedly onerous, would appear to be far from remunerative. In respect to the examinations an investment of £2450 represents the accumulations from excess of receipts over expenditure during nearly seventy years. Even this is in danger of disappearing, for in a special note it is stated that the annual receipts for licences, etc, which are not given, from the Court of Examiners are not now sufficient to meet the payments, although the fees paid to the examiners are very inadequate. The maintenance of the botanic garden also involves a considerable expenditure. Owing too to certain difficulties the power granted by the Charter of 1617 to "buy, sell or make drugs," which might have been expected to prove a source of income, was not until recently exercised by the Society, but certain members were allowed to carry on such trade in the name of the Society for their own personal profit as a private company or partnership under various titles. Owing, however, to such trade having resulted in a loss this private partnership was dissolved as from the end of 1880, it being at present in liquidation, and the Society is now, as an experiment only, carrying on the trade at its own risk. But notwithstanding the absence of reward in the shape to which even City Companies may be supposed not to be averse, the Society of Apothecaries finds consolation in having conferred great benefactions upon the public. Amongst these the Society formally claims that by means of a body created out of itself, and allowed to use its name under its control it has secured to the public the use of pure and unadulterated drugs and "(so to speak) fixed the standard of purity in such articles," and that therefore as an examining or licensing body, or "as a body associated with and accepting practically "a responsibility in reference to a standard in the "matter of drugs," the continued existence of the Society is both a necessity and an advantage. No wonder, therefore, that the members of a deputation which stated in evidence before the Commission that the Society, besides being a medical licensing body, was celebrated for the sale of genuine drugs and still supplied a large quantity to hospitals and dispensaries, felt able, in reply to a question put by Alderman COTTON, to acknowledge that they prided themselves in being "really most useful" in their generation.

It will be seen from a statement upon another page that the Council of the Pharmaceutical Society has accepted an offer from Mr. Balmanno Squire respecting the institution of a practical botany prize in memory of the late distinguished pharmacist, Mr. Peter Squire. It is intended that the first competition for the prize shall take place in July next, and it will be open to all persons who pass the Minor examination between that time and the 1st of October last.

* * *

It also appears from the official report that the Benevolent Fund has again been augmented by a donation of twenty guineas from the Committee of the Junior Pharmacy Ball, which has been received through the energetic Honorary Secretary to the Ball, Mr. W. H. Kerr.

* * *

A meeting of gentlemen interested in the Chemists' Ball was held on Monday last, at 17, Bloomsbury Square, and it was determined that the nineteenth Annual Ball should be held at Willis's Rooms, on Wednesday, January 14th next. A Committee was appointed, with the President of the Pharmaceutical Society as Chairman. Mr. Richard Bremridge was appointed Honorary Secretary and will be glad to receive the names of any gentlemen who will become Stewards. The liability of each Steward is limited to two tickets, one gentleman's and one lady's.

* * *

We learn from the *Melbourne Age* that a deputation, consisting of Mr. C. R. Blackett, the President of the Victoria Pharmacy Board, Mr. Huntsman, President of the Pharmaceutical Society of Australia,

and other gentlemen, recently had an interview with Mr. Berry, the Chief Secretary of the Colony, to ask that a sum of money might be placed on the estimates to enable the Pharmaceutical Society to provide for the education of persons wishing to become chemists and druggists. The grounds stated for the application were that the existing means for providing education in pharmacy were very limited, but that the Society had at considerable expense established a School of Pharmacy, which with some aid from the Government might become affiliated to the University of Melbourne. It was pointed out that the University at present failed to provide for this branch of education, though it was very necessary if only for the sake of the medical students, and it was urged that the School of Pharmacy should be put upon the same footing as the schools of mines at Ballarat and Sandhurst, which are subsidized. The reply of the Chief Secretary can hardly be considered a favourable one. After premising that the deputation came at an unfortunate time, he said that it was not clear to him why the University of Melbourne, as a handsomely endowed institution, should not provide for the teaching of pharmacy, which certainly came within its functions. He would like to see some of the spoon-fed institutions which were in existence already got rid of, rather than be asked to assist new ones. He promised, however, to bring the subject under the notice of the Cabinet.

* * *

A sad accident is reported to have happened on the premises of Mr. J. Balkwill, Kingsbridge, during the preparation of "coloured fire." It appears that having weighed out six ounces of potassium chlorate and four ounces of sulphur, Mr. Balkwill left an apprentice with instructions to pound the chlorate in a mortar. The lad, however, placed the chlorate and sulphur together into the mortar, the result being an explosion fatal to the apprentice and causing considerable damage to property. The inquest has been adjourned for the attendance of a Government inspector.

* * *

The School of Pharmacy Students' Association will recommence its meetings on Thursday evening the 13th inst., when the chair will be taken at 8 p.m., by the President of the Association, Professor Attfield, F.R.S., and the opening address will be delivered by Mr. R. W. Giles. At this meeting the officers for the session will be elected.

* * *

We understand that the opportunity afforded by the above-mentioned meeting will be taken to present to Mr. W. R. Dunstan an illuminated address from members of the Association and other students, past and present, of the School of Pharmacy, on the occasion of his resigning the post of Demonstrator of Chemistry in the School and that of Secretary to the Association. The presence and support of old students is invited.

* * *

A meeting of the Chemists' Assistants' Association will be held at 103, Great Russell Street, on Wednesday evening next, November, 12th, at 9 p.m., when Mr. E. M. Holmes, F.L.S., will read a paper upon "The Various Uses to which the Same Drugs are put in Different Countries." On the following Wednesday, November 19th, the annual Conversazione of the Association will take place in St. James's Hall.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

October 28 *to* 31, 1884.

Present on each day—Messrs. Baildon, Clark, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Maclagan attended on the 29th, 30th and 31st, on behalf of the Privy Council.

MAJOR EXAMINATION.

22*th.*—*One* candidate was examined, but failed to pass.

MODIFIED EXAMINATION.

28*th.*—*One* candidate was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Baines, Thomas .....Kendal.

MINOR EXAMINATION.

28*th.*—*Eleven* candidates were examined. *Eight* failed. The undermentioned *three* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bell, Henry .....Port Glasgow.
Berry, Walter .....Manchester.
Center, Joseph Allan .....Edinburgh.

29*th.*—*Twelve* candidates were examined. *Four* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cockburn, Charles Taylor .....Glasgow.
Deighton, Frank .....Bradford.
Duncan, John Glendinning B. ..Gainsborough.
Duncan, William .....Leith.
Farquhar, John McKelvie .....Greenock.
FitzHugh, William Henry .....Royston.
Hendry, Patrick Muir.....Edinburgh.
Hornblower, Joshua Thomas ...Birmingham.

30*th.*—*Twelve* candidates were examined. *Seven* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jones, Ebenezer Owen.....Swansea.
Lunan, George .....Banchory Ternan.
McInnes, Archibald Sinclair ...Crosshill.
Norman, Arthur Henry .....Newmarket.
Phillips, George .....Dowlais.

31*st.*—*Twelve* candidates were examined. *Five* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Rae, Robert Sanders .....Annan.
Reid, Neil.....London.
Robertson, George .....Portsoy.
Sara, Herbert .....Falmouth.
Simpson, Alexander Henderson.Rubislaw.
Taggart, Robert .....Glasgow.
Williams, James Boden .....Manchester.

MEETING OF THE COUNCIL.

Wednesday, November 5, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Squire, Symes, Williams, Woolley and Young.

The minutes of the previous meeting were read and confirmed.

DIPLOMAS.

The following, being duly registered as Pharmaceutical

Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Cripps, Richard Augustus.
Hart, Thomas.
Jackson, Frederick.

Elections.

ASSOCIATES IN BUSINESS.

Augustus Frederick Tregear, of London, having passed the Modified Examination, being in business on his own account, and having tendered his subscription for the current year, was elected an "Associate in Business" of the Society:—

ASSOCIATES.

The following, having passed the Minor examination, and paid (as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Barritt, Ernest Henry.....Colchester.
Barton, John.....Warwick.
Bowes, John William .....Pocklington.
Buxton, Thomas .....Belper.
Campbell, William Miller .....Paisley.
Cave, James Robert .....Windsor.
Center, Joseph Allan .....Edinburgh.
Crassweller, William Ellis .....Bury St. Edmunds.
Duncan, John G. Bryden .....Gainsborough.
FitzHugh, William Henry.....Royston.
Francis, James Bridge .....Wrexham.
Gregson, Joseph .....Manchester.
Hassall, Stephen .....Eton.
Haywood, William Henry .....Liverpool.
Judge, Edgar Harvey .....Newark.
Livesey, William Forrest .....Preston.
Lloyd, Isaac Thomas .....London.
Menhinick, Charles H. Foott...Stonehouse.
Morris, Henry Wm. George ...Charlbury.
Phillips, George .....Dowlais.
Pimm, Henry Arthur .....Torquay.
Rae, Robert Sanders .....Annan.
Rees, John .....Aberystwith.
Reid, Neil .....London.
Richards, John William .....Pontypridd.
Simpson, Alex. Henderson .....Rubislaw.
Smith, John Henry ....Coventry.
Steeples, William Stanley .....Ripley.
Topham, Thomas ....Mirfield.
Tucker, Percy .....Exeter.
Tudor, William Thomas ....Brecon.
Wheeldon. William Henry .....Derby.
Worsley, William.....Wigan.

APPRENTICES OR STUDENTS.

William Arthur Morris (Bath) having passed the Preliminary examination and tendered his subscription for the current year, was elected an "Apprentice or Student" of the Society.

Restorations.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Reports of Committees.

FINANCE.

The report of this Committee was received and adopted and sundry accounts were ordered to be paid.

In moving the resolution the President stated that among the donations to the Benevolent Fund recorded during the previous month was a donation of £21 from the Committee of the Junior Pharmacy Ball, through the Hon. Secretary, Mr. W. H. Kerr.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£15 to the widow (aged 71) of a chemist and druggist, member from 1874 to 1883 and subscriber to the Fund. Husband was in business twenty years. (Surrey.)

£10 to the widow (age 54) of a registered chemist and druggist, who was in business for twenty-five years. (Durham.)

£10 to a registered chemist and druggist (age 70), Applicant has had three previous grants. (Lancs.)

£10 to the widow (age 51) of a registered chemist and druggist. (Hants.)

£10 to the widow (age 57) of a registered chemist and druggist. (Wilts.)

The Committee stated that it had carefully considered a letter from Mr. Vizer containing certain suggestions with regard to the Fund and desired to thank him for the same, but did not see its way to recommending their adoption.

It was resolved that the Benevolent Fund Committee be requested to undertake the distribution of the fund provided by Mr. Robbins's special donation.

On resuming, the report and recommendations were unanimously adopted.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
July	Day	385	24	1	14
	Evening	100	12	0	4
August	Day	56	10	0	2
September	Day	75	13	1	5

Circulation of books.	No. of Entries. Town.	Country.	Total.
July	131	99	230
August	59	47	106
September	49	89	138

Carriage paid—	£	s.	d.
July	1	9	0½
August.	0	16	1½
September	1	8	0

The Librarian had also reported that in making the annual inspection of the Library he had found that the undermentioned books were missing:—

Attfield's Chemistry, 9th ed.
Bentley's Manual of Botany, 4th ed.
Hardwick's Manual of Photographic Chemistry, 9th ed.
Martindale's Extra Pharmacopœia, 3rd ed.

The Committee recommended that the missing books be replaced by new copies, and that the above list be advertised in the Journal and Library.

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Mueller (F. v.), Eucalyptographia, decades 1–9, 1879–83. From the Government of Victoria.
Daenen (E.), Observations sur le laudanum liquide de Sydenham, 1884. 2 copies. From the Author.
Gay (F.), Altérations dites spontanées des médicaments chimiques, 1884. From the Author.
Monthly Magazine of Pharmacy, 1876–82. 5 vols.
Chemists Journal, 1880–82. 5 vols.
From Mr. J. Strickett.
Flückiger (F. A.), Die Industrie der ätherischen Oele in Grasse, 1884. From the Author.
Méhu (C.), Sur la recherche de très petites quantités de sucre dans l'urine, 1884.
From the Author.
Kerr (J. G.), Manual of Materia Medica, in Chinese, 2nd ed., 1876. 2 vols.
From Mr. H. A. Woolnough.
Fridolin (A.), Vergleichende Untersuchung der Gerbstoffe der Nymphaea, etc., 1884.
From Professor Dragendorff.
Catalogue with explanatory notes of the Exhibits from the Department of Education, Empire of

Japan, International Health and Education Exhibition, 1884.

From the JAPANESE COMMISSIONERS.

The Committee recommended the purchase of the undermentioned works:—

Stillé and Maisch, National Dispensatory, 3rd ed., 1884.
Hooker (J. D.), Student's Flora, 3rd ed., 1884.
Ross (W. A.), The Blowpipe in Chemistry, Mineralogy, and Geology, 1884.
Frankland (P. F.), Agricultural Chemical Analysis, 1883.
Jevons (W. S.), Principles of Science, 1883.
Life and Works of Thomas Graham, by R. A. Smith.
Sprague (J. T.), Electricity, its Theory, Sources and Applications, 2nd ed., 1884.
Stevenson (J.), Flora of British Fungi, 2 vols.
Seboth (J.), Alpine Plants, edited by A. W. Bennett, 4 vols., col. plates.
Raspe (F.), Heilquellen-Analysen, 1884.
Hirsch (B.), Universal-Pharmakopöe.

Curator's Report.

The Curator had reported the attendance in the Museum to have been:—

	Total.	Highest.	Lowest.	Average.
August . .	62			
September .	168	27	10	11

The following donations to the Museum had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of pure Curcumin, Diphenol, and Salicylic Aldehyde prepared from sodium-phenol and chloroform. From Mr. W. H. INCE.
Specimen of Mozambique Opium containing 9·8 per cent. of morphia. From Mr. J. WINK.
Specimen of Tanne seeds from Japan.
From Messrs. BROOKS and GREEN.
Specimen of dried Aloe leaves from Natal.
From Messrs. LEWIS and PEAT.
Specimens of Papiol root from Mexico; Teymbeki leaves from Persia; Yarkasura nuts from Colombia; and Cedron fruit.
From Messrs. T. CHRISTY and Co.
Specimen of Camphor oil.
From Messrs. WRIGHT, LAYMAN and UMNEY.
Specimens of ecuelled Oil of Limes and of distilled Oil of Limes.
From the Montserrat Co., per Mr. J. STURGE.
Further specimens of Japanese Drugs.
From the DIRECTOR of the Royal Gardens, Kew.
Specimens of the herb of *Baccharis genistelloides*.
From Messrs. DAVY, YATES and ROUTLEDGE.
Fine specimens of Palton bark, soft Carthagena bark, and an authentic specimen of the bark of *Cinchona crispa*, Tafalla.
From Messrs. HOWARDS and SONS.
Specimens of the plants yielding the West African drugs "Aviangti," "Artan" and "Ehruju."
From Dr. SYDNEY RINGER.
Specimen of the plant which yields "Northern" Senega (*Polygala Senega* var. *latifolia*).
From Messrs. MERRELL, THORP and LLOYD, of Cincinnati.

The Curator read the following letter from Mr. J. W. White, of Clifton, who had forwarded one hundred and twenty specimens of beautifully preserved British plants:—

"52, Royal York Crescent, Clifton.
"*September* 23, 1884.

"Dear Mr. Holmes,—I have now the pleasure of sending you for the Society's Herbarium about one hundred and twenty specimens of South and West of England plants, which I trust will prove an acceptable addition to the collection. They are all of my own gathering within the last year or two, and therefore are in fairly good condition.

"I think that although our branch of science is not the most popular among the pharmaceutical body there might be found in each of Watson's Provinces one or two botanical pharmacists. If these could be induced to favour their Society with examples of the plants peculiar to their respective districts you would soon possess a thoroughly representative British Herbarium, which would be creditable to the Society, and no small advantage to the students privileged to refer to it.

"With kind regards, believe me,
"Yours faithfully,
"JAS. W. WHITE.

"E. M. Holmes, Esq., F.L.S., etc."

The Committee recommended that the Library catalogue be revised and reprinted, and had instructed the Secretary to obtain information as to cost, etc., by next meeting.

The Curator had been requested to confer with the President and report at the next meeting what arrangements could be made for the better keeping of Herbarium specimens.

The Professors had attended and reported satisfactorily of their respective classes.

The Committee had considered the list of local centres for the Preliminary examinations, and did not recommend any change therein.

It was recommended that the regulations affecting the Council prizes and Jacob Bell Scholarships be altered so as to allow of the appointment of persons not members of the Board of Examiners to conduct such examinations.

Also that the list of subscribers to the Benevolent Fund for present year be published in the Journal of February 28th next, and that a copy be sent to every person whose name appears on the Register of Chemists and Druggists. It was also recommended that in future the extra postage of the Journal to members residing in the colonies or abroad should not be charged to those members.

The PRESIDENT in moving the adoption of the report, said the most important recommendation was that having regard to the publication of a special number of the Journal in Feburary. This was only carrying out the line of policy which was decided upon by the Council two years ago, that there should be an annual publication of the list of subscribers, the time when it should be published, and other matters of detail being referred to the Library Committee. Another matter was the Library catalogue, which it was recommended should be reprinted, and the Committee hoped to be able to make an economical arrangement by which this catalogue could be printed annually at the same cost as was now incurred by printing it every five or six years. The other points he would mention were matters of detail, one referring to the office and two to the examinations. It had been usual to charge to members of the Society residing abroad the extra postage involved in sending them the Journal, but on consultation with the Secretary it had been considered desirable that this should no longer be done. The local centres at which Preliminary examinations were held had been carefully considered, and although there might be some reasons for including Leicester in the list, and its claims had not been forgotten, it was thought on the whole not desirable to make any change. With regard to the Jacob Bell Scholarships and the Council Prizes examinations it was considered that as these sometimes went into rather special subjects it might be well to have the power to appoint examiners outside the Board of Examiners, as there were many capable men throughout the country who had not the time to undertake the office of examiners, but who would be willing to conduct a written examination on any branch on which they were authorities. This would be a compliment to them, and would perhaps be the means of keeping up interest in the Society's work. Of course it did not preclude the Council from appointing

the regular examiners, but allowed it to appoint anyone it chose. Speaking for the Board of Examiners of England and Wales he thought the members would be very glad to be sometimes relieved of this duty, which had often fallen very heavily upon comparatively a small number of them.

Mr. RICHARDSON remarked with regard to the local centres that there were now on the list Nottingham, Peterborough and Lincoln, which were all pretty much together, and he thought one of them might have been replaced by Leicester, as there was considerable inconvenience in some of the small towns round Leicester in getting to Nottingham, the railway communication not being so good as it used to be.

Mr. SYMES remarked that if any man were selected as an examiner for these prizes on account of his eminence as a specialist there might be a danger of his looking on his particular branch as a specialty and making the examination more difficult in that particular direction, and, therefore, a good deal of discretion would require to be exercised.

The PRESIDENT said he did not think the least danger would arise with members of the Society.

Mr. WILLIAMS asked if the selection was to be limited to members of the Society.

The PRESIDENT said it was not, and he did not think it would be desirable to so limit it ; but of course the selection would be in the hands of the Council each year.

Mr. GREENISH said when these prizes were instituted the question was raised whether persons outside the Board of Examiners might not be selected to set the questions, and he was glad to see an inclination to get out of that rut in which the Council had been going for so many years. He thought it was most desirable to do so, and that some half a dozen examiners should not be continually employed setting the questions for the examinations for these particular prizes. If outside examiners were obtained he thought it would give more importance to the examinations. Besides that, he hoped that this might prove to be only the thin end of the wedge, and that the Council might see its way by-and-by to getting outside examiners to set the questions for the class examinations in connection with the school, which he thought might easily be done with the aid of the syllabus of lectures. He had several times brought this subject forward, and could not understand what difficulty there could be in the matter. It seemed to him with a syllabus of lectures there could be no difficulty in any professor setting the questions so as to determine whether the students had grasped the whole course of instruction delivered to them in the school, and he hoped in time the Council would see its way to do something of the kind.

Mr. WILLIAMS said this recommendation with regard to the examinations was one of the most important matters which had come forward for decision for some time, and ought not to be accepted without consideration. He had no doubt the Committee had thought the matter out thoroughly, and probably the recommendation was a wise one, but at the same time he must be allowed to remark that he was sorry the Committee had come to this conclusion. He thought it was the thin end of the wedge, as Mr. Greenish had stated, and that was what he was sorry to see. He thought the Board of Examiners ought to be able to provide examiners for all these subjects without any difficulty, and without the work falling exclusively upon three or four members, and if this could not be done it was rather a reflection on the Board. An examiner required experience in the work; however talented a man might be it would be improper to call upon one who had no experience in examinations to examine candidates for these important prizes. No doubt the Council would be careful to appoint men who did understand the business, but as Mr. Greenish had spoken about the thin end of the wedge it was just possible it might not. At the present time the office was confined to those who, at any rate, were presumed to be competent examiners, and who had had practical experience, but it was now proposed to throw it entirely open, so that those might be appointed who might not be so competent. He should not oppose the recommendation, but at the same time he thought the Council ought to bear in mind that there was another aspect to this question, and he hoped the members of the Board of Examiners would not feel that any slight was cast upon them.

The VICE-PRESIDENT said the Committee had very carefully considered this question, and he thought the reasons already assigned by the Chairman were worthy of being recorded. One which weighed very strongly with him was this, not only that the work had fallen heavily on a comparatively few men who had time and ability for the work, but the strongest argument for the change was that there were men in the country who could not spare the time to come to London for three days consecutively for regular examination work, but who were prepared in their own homes to assess the value of papers submitted to them. He happened to know several men of this class who could not serve on the Board of Examiners, but who would by common consent be recognized as being especially adapted to undertake work of this kind, and who, he believed, would be willing to do so. He was not afraid of the thin end of the wedge policy, because he did not wish to drive the wedge any further. In fact he should dissent from the view put forward by Mr. Greenish with regard to class examinations in the school. On that point he was very much struck with the thoughtful and cogent remarks of Professor Michael Foster in his address to the students last year, that the best examiners in school work were the teachers in those schools, and advocated the curing of evils of examination by multiplying and constantly repeating them. He pointed out that those best able to judge of the value of the work done by students in the course of their education were the men who were imparting that education, and he did not want to see an outside agency brought in to examine the school work. With regard to the Jacob Bell scholarships, and the Pereira Medal and other Council prizes, he thought there was a very good reason for the importation of that help from without which was only waiting to be asked for.

The PRESIDENT said he did not think the matter was so serious as Mr. Williams seemed to think ; it was only giving the Council a little more latitude when the time came for appointing these examiners. Before the passing of the Pharmacy Act there was a Board of Examiners, consisting of something like fifty, and he was quite certain that there were a number of men throughout the country who might be made use of from time to time, and whose interest in the Society it was desirable to keep warm.

Mr. HAMPSON said he should not like the report of this Committee to pass without reference to the addition received to the Herbarium, which had been forwarded by Mr. White, of Bristol, and he hoped his letter would be published.

The PRESIDENT said the letter would be published.

The resolution was then carried unanimously.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor stating what had been done with regard to the various cases placed in his hands.

W. Wills, grocer, Bridge Street, Exeter,
had paid a penalty of £5 and costs into Court.

F. Bradley, 161, York Street, Hulme, Manchester,
had paid two penalties and Court costs into Court.

T. W. Dyball, 27, St. Nicholas Street, Ipswich,
had paid £5 penalty and costs.

N. Withnal, Moss Lane West, Manchester,
had paid a penalty of £5 and Court costs and a judge's order had been obtained for payment of costs on the higher scale.

A case of infringement had been considered by the Committee, and it was recommended that proceedings be taken.

The report and recommendations of this Committee were unanimously adopted.

BYE-LAWS.

This Committee had held a meeting at which the alterations previously agreed to had been considered, and a few verbal alterations made. The draft bye-laws were presented with the recommendation that they be considered by the Council at at early date, and that the necessary steps for making them valid be taken without delay.

It was resolved that the report be received, printed and forwarded to each member of the Council.

PETER SQUIRE PRIZE IN PRACTICAL BOTANY.

A letter was read from Mr. Balmanno Squire in reference to the foundation of a botanical prize in memory of the late Mr. Peter Squire. The letter was ordered to be acknowledged, with the thanks of the Council for Mr. Balmanno Squire's offer of funds for that purpose.

It was also resolved that notice should be given that the prize will be competed for in July next. The prize will be known as "The Peter Squire Prize in Practical Botany," and it will be open for competition to all persons who have passed the Minor examination since the commencement of the previous October.

The PRESIDENT said he had received a letter from the Société Pharmaceutique of Boulogne-sur-Mer, couched in very friendly terms, and he would move that a copy of the Journal and the Transactions be sent regularly to the Society.

The motion was carried unanimously.

REPORT OF EXAMINATIONS.

October, 1884.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (15th)	6	2	4
,, (16th)	6	1	5
	— 12	— 3	— 9
Minor (15th)	23	7	16
,, (16th)	24	7	17
,, (22nd)	28	9	19
,, (23rd)	30	11	19
	—105	— 34	— 71
	117	37	80

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Major (28th)	1	0	1
Minor (28th)	11	3	8
,, (29th)	12	8	4
,, (30th)	12	5	7
,, (31st)	12	7	5
	—47	—23	—24
Modified (28th)	1	1	0
	49	24	25

Preliminary Examination.

	Examined.	Passed.	Failed.
Candidates (14th)	288	144	144

Twenty certificates had been received in lieu of the Society's examination.

10 University of Cambridge.
1 ,, ,, London.
1 ,, ,, Oxford.
5 College of Preceptors.
1 Faculty of Physicians and Surgeons of Glasgow.
1 Royal College of Surgeons of England.
1 Incorporated Law Society.

The PRESIDENT said the members of the Council had no doubt all received notice to attend in Edinburgh on the 12th and 13th instant, to assist in the celebration of the opening of the Society's new premises, and he was sure Messrs. Young and Borland would be happy to furnish any information to anyone who desired it. He was deputed on the part of the officers in Edinburgh to express the hope that as many as possible would avail themselves of the opportunity of being present on this interesting occasion, and their desire to make the gathering as successful as possible. He was quite sure that those who knew anything about Scottish hospitality would need no further assurance as to the warmth of the reception that would be extended to them.

EVENING MEETING.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The second Evening Meeting of the session was held on Wednesday evening, 15th inst., the chair being taken at half-past eight.

The minutes of the previous meeting having been read and confirmed, at the request of the President, Professor Attfield read a paper on the—

PROXIMATE CONSTITUENTS OF HEDYCHIUM SPICATUM.

BY DR. THRESH.

The paper is printed at p. 331, and gave rise to the following discussion:—

The PRESIDENT, in moving a vote of thanks to Dr. Thresh for this interesting contribution to the chemistry of the materia medica, remarked that this was one of the directions in which pharmacists were specially qualified from their previous knowledge and training to render considerable service in the future. This was not the first time Dr. Thresh had contributed original papers, showing how well he could perform such work.

Mr. SCHACHT said it was almost impossible to criticize a paper of this kind, but it was a matter of very considerable interest that a chemical compound which up to the present time had been supposed to exist only in the mind of the laboratory investigator should have been recognized as being produced naturally in a vegetable substance. Such bodies were very numerous, and almost tempted one at times to think that man might be a creator, but in the present instance this was shown not to be the case, for this compound which had been revealed in the laboratory of Dr. Perkin, and had been supposed to exist only as the result of his experiments, was now found to exist in nature.

The PRESIDENT said he ought to have referred to the fact that Dr. Thresh's experiments were in the first instance directed to the determination of the odorous principle, but, as often happened in chemical investigations, in looking for Peter he had found Paul. Dr. Thresh had not yet found the odorous principle, but he had found something else and thoroughly examined it. Although, however, he had given the results of an exhaustive analysis of this particular substance, he still intended to look for the odorous principle, and there was no doubt that if he obtained sufficient material to work with he would find it. It was remarked in the address delivered there last month, that there was an immense amount of work to be done in the examination of products in the vegetable kingdom, which would probably illustrate the fact adverted to by Mr. Schacht,

that very many of these interesting substances which had been found by Perkin and others, by synthetic processes, were really natural products.

The vote of thanks having been carried, Professor Attfield read the next paper on—

The Presence of Oxides of Mercury in Blue Pill and in other Mercurial Preparations.

BY HAROLD SENIER, F.I.C., F.C.S.

The paper is printed at p. 362, and gave rise to the following discussion:—

Mr. Umney said he was not sorry that Mr. Senier had brought this matter forward, inasmuch as he thought the paper read by Messrs. Dechan and Maben, at Hastings, required a little more discussion. He had had some experience during the last twenty years in making blue pill, and had occasionally examined the product chemically, and he must say that his experience accorded more with that of Mr. Senier than with that of Messrs. Dechan and Maben. During the last week he had a specimen examined which was made in March last, by machinery, and his assistant, Mr. Braithwaite, found the percentage of mercurous oxide was about 2 per cent., whilst the mercuric oxide was about 1·2 per cent. He had not compared the merits of the two analytical processes, but judging from his experience of analytical work there could be little doubt that hydrochloric acid as a solvent, especially in the presence of organic matter, would be far preferable to acetic acid. The acetic solution might answer very well with such a preparation as grey powder, but was not likely to succeed with any degree of accuracy, with such a body as blue pill, containing sugar, probably in more than one form, and other bodies also. This was a matter which could easily be determined by experiment as it seemed to have been by Mr. Senier. It would appear from the discussion at Hastings, that the state of pharmaceutical morality in the country was something deplorable, for that out of eight specimens of blue pill five were found (?) to be made with confection of hips instead of confection of roses, the experimenters having apparently come to that conclusion from the fact that they did not obtain a certain colour reaction (pink colour), on digesting the blue pill with acetic acid. That seemed to him rather like jumping to a conclusion, in the absence of not having ascertained whether there was any tannic acid present. If they had tested the blue pill with ferric chloride he ventured to think they would have had a black colour produced, which would have convinced them that a considerable amount of astringent matter was present, such as would be found in rose leaves, but not in hip pulp or confection. The preparation of blue pill by machinery,—generally very heavy machinery,—gave a product slightly contaminated with iron, and this was no doubt the source of the error. Blue pill was generally made by triturating metallic mercury with confection of roses in the bed of a large mill, the stones being of granite, and as the particles receded from the millstones they were brought beneath them again by a sweeper which followed the stones in their circuit. This sweeper was not unfrequently made of iron, and he had no hesitation in saying that it was the action of the tannic acid of the rose leaves on this iron that accounted for the disappearance of the pink colour and the substitution of a faintly bluish black solution when the pill was treated with acid which had led those gentlemen into an error. Only that day he had tried a specimen of blue pill which did not give the pink colour (it was faintly black), and he could testify that it was made of roses, liquorice powder and mercury only. The method of preparing blue pill had been varied in the United States and other Pharmacopœias; but as far as he could judge, none of the suggested methods were preferable to the English. In reference to grey powder, he did not think that it was now generally prepared in a rotating barrel containing stone balls. His own process, adapted for the preparation of 100 lbs. on each occasion, consisted of drying prepared chalk for two or three days so as to remove most of the water, and then triturating it under granite millstones with mercury, the process occupying seven or eight hours, trituration being continued until the mercury was no longer visible by an ordinary pocket lens.

Professor Redwood said this was a subject in which he had taken considerable interest for the last quarter of a century; and he might claim to have first brought under the notice of pharmacists and others the facts referred to in the paper. The origin of the discussion which took place in 1860 was as follows. It was then charged against pharmacists that grey powder and other preparations were made with mercury in a very impure state, containing both arsenic and antimony, this statement being made by a gentleman of considerable chemical as well as medical eminence, Dr. Thudichum. It was made ostensibly for the purpose of explaining why in a case where mercury and chalk had been administered death subsequently took place. It was the case in which Dr. Smethurst was accused of having committed a murder, and the evidence adduced in his favour was to the effect that the poison really was in the mercury and chalk, and that it originated in the employment of mercury which had been used by looking-glass makers, squeezed out afterwards with a good deal of the tin alloy, and hence the presence of arsenic and antimony in it. This subject was thought to be of such great importance as affecting the pharmaceutical body that he undertook the investigation of it, and made a large number of analyses of samples collected from different sources, the result being that arsenic and antimony were not found; but, as had been already remarked by the President, whilst looking for Peter he found Paul, because whilst he failed to find what had been averred as the impurity in these preparations, he had found the oxides of mercury. Two papers were communicated to the Society, the latter of which had for its object to indicate the extent to which oxide of mercury was present in grey powder, in blue pill and in mercurial ointment. In the experiments then made he commenced by operating much in the way Messrs. Dechan and Maben had done with acetic acid; but he speedily gave up that method, and he believed he was the first to introduce a process identical with that now adopted by Mr. Senier, of treating mercurial preparations first with hydrochloric acid and subsequently with hydrocyanic acid, and his most reliable results were certainly obtained by that method. He was not present at Hastings when the paper was read, but he regretted much the charges made upon pharmacists which it contained. He had, however, been surprised at hearing the paper just read by Mr. Senier, and he confessed that in this respect he differed from Mr. Umney, for he sided rather with Mr. Maben than with Mr. Senier. He was not quite satisfied that both parties might not be, to a certain extent, right, and he saw no reason why because Messrs. Dechan and Maben did not obtain results with regard to blue pill coinciding with those that Mr. Senier obtained, that, therefore, there must either be an error in the process or in the manipulation. The examinations he had made from time to time from 1860 downwards tended to show that whilst mercury and chalk was frequently largely contaminated with the two oxides of mercury, blue pill was not. He had generally found small percentages of the oxide in blue pill, but not to any material extent, and it certainly astonished him to find Mr. Senier indicating that of the two preparations grey powder was the one least liable to the formation of oxide of mercury. His experience was entirely in the opposite direction. He had satisfied himself that if mercury and chalk were prepared according to the instructions given in the Pharmacopœia by simple trituration in a mortar, it was, what medical men had long held it to be, a valuable and perfectly safe preparation. But since it had become the

practice for manufacturers to make it by putting the two ingredients with two or three large round pebbles into a cask. He saw that Mr. Umney was shaking his head, but he was simply giving the result of his own observations; he had seen it done in that way, and if anyone would refer to the *Pharmaceutical Journal* of 1860, when the paper was read, they would find that was the way in which it was then made by wholesale druggists, and Mr. Whipple, who was not only a very intelligent pharmacist, but largely engaged in manufacturing operations, admitted that that was the method by which it was prepared. That method might have been relinquished since and stone runners substituted for it, and he should be quite prepared to find there would be less liability to contamination with oxide when prepared in that way. But when he saw it in operation under Mr. Whipple's direction, the ingredients were put in a cask, and fastened up; the cask was fixed on a spindle and turned by a band attached to the steam-engine; it was thus trundled round not merely for hours, but, for aught he knew, for many days, and there was no opportunity of opening it to see how the process was going on. It appeared to him that under those circumstances the mercury was subjected to conditions in which oxidation took place to a very great extent. Where it was placed under stone runners of course the man in charge might examine it from time to time, and it would not be subject to the same oxidizing action as in the other case. With regard to blue pill, the samples he had principally examined were made by the old process of trituration in a mortar, although some had been made by machinery; but what he could not understand in this paper of Mr. Senier's was that whilst, on the one hand, he referred to the action of sugar and the astringent matter in the confection of roses as reducing the acetate of mercury, at the same time he represented that it would have a more powerful oxidizing action than the chalk triturated with mercury in contact with atmospheric air. He entirely differed with him on that point. It appeared to him on the face of it that the ingredients which were present in blue pill would tend to counteract and prevent oxidation rather than otherwise, and further, he could not understand why it was suggested that oxidation proceeded when it had been kept for some length of time. He could understand the oxidation taking place whilst the mechanical trituration was being effected, and how in process of time the mercurous oxide became converted into mercuric oxide, but he could not understand and was incredulous of the fact that that portion of the mercury which was in the metallic state incorporated with the conserve of roses should undergo a continuous process of oxidation.

Mr. SCHACHT said he happened to be present at Hastings when the paper by Messrs. Dechan and Maben was read, and he would now venture to repeat what he then said. His observations were confined to one preparation, grey powder, because it was only on matters with which one had had actual experience that one ought to speak in such a discussion. He had had occasion carefully to examine an old sample of grey powder in his own pharmacy, which he had found to be largely contaminated with oxide of mercury. Of course the moment that was discovered it was thrown away and a fresh quantity made. He found, on reference to the laboratory book, that this sample was the last portion of a quantity which had been prepared rather more than three years ago, at a time when he believed mercurial preparations were more largely prescribed than they now were, the result being that it had lasted a longer time than was expected; at any rate the result proved that too large a quantity was made. He ventured even now to think that it was a question entirely of age, and, therefore, at Hastings he ventured to urge upon pharmacists to make this preparation themselves. There was no difficulty in the matter, and nine pharmacists out of ten could easily prepare their grey powder. Whatever precautions were adopted by wholesale manufacturers,—and no doubt the precautions now taken were much superior to those employed at the time to which Professor Redwood referred,—and though they sent it out with a very small percentage of contamination, yet at last it came to a question of how long it had been kept in the two establishments put together. If he bought $\frac{1}{2}$ lb. or 10 lbs. from a wholesale house he would know how long he had it in his own establishment, but he did not know how much longer it had been kept in the manufactory, and he was quite certain it suffered in proportion to the length of time it was kept. He could not help being struck with what appeared to be the anomaly suggested, that blue pill was less likely to preserve its integrity than grey powder, but he would add nothing to what had been already said by Professor Redwood on that point.

Mr. NAYLOR regretted that in this paper the most deplorable feature in connection with the paper read at Hastings had not been referred to, namely, the very marked and serious deficiency in the mercurial element in blue pill. On that occasion it was shown by the analysis of Messrs. Dechan and Maben that there was a difference of at least 13 per cent., which was far greater than could be accounted for on the ground of consistency. No doubt manufacturers had, since that paper was read, examined their stock, and he had hoped when Professor Redwood told them he was in the habit of examining these preparations that he would have thrown some light on this point. It was quite contrary to his experience that blue pill, of which alone he had had experience, had this large deficiency. He was glad to find the statement combated with reference to substituting confection of hips for confection of roses, and he might add that the process suggested by those two gentlemen had not answered at all in his hands.

Mr. GERRARD thought Mr. Schacht's suggestion was a most admirable and practical one. If one considered the percentage of mercuric oxide present in some of these samples of mercurial preparations, which ranged from little less than 1 to 2 per cent., and then calculated the dose of blue pill given, and the percentage of oxide in an ordinary dose, say 5 grains, the dose of mercuric oxide taken in a 5 grain pill would be $\frac{1}{10}$ of a grain which was really a very large dose, quite sufficient when repeated two or three times a day to effect the full physiological action of mercury. Therefore it behoved them to take seriously into consideration Mr. Schacht's suggestion of making mercurial preparations from time to time for their own use, say at periods of three or six months, so as to insure having them in a fresh condition, free from the injurious mercuric salts. Mercurous oxide was perhaps less objectionable than the mercuric, but the latter was stronger even than mercuric chloride.

The PRESIDENT then proposed a vote of thanks to Mr. Senier for his communication; for whether he was perfectly right or not, he had assisted in a general conclusion, and all such papers were to be welcomed. He was bound to say that within certain limits he rather sided with Mr. Senier than with Professor Redwood, who he thought had to some extent misinterpreted one or two of the observations Mr. Senier had made. It appeared to him that he had interpreted some of Mr. Senier's observations in a way which the context did not quite justify. This, however, was a mere matter of detail. The remark with which he would like to close the discussion would be rather of this nature, What was required in blue pill and in grey powder? Could Professor Redwood tell them, with his more than a quarter of a century's experience, or could any of the medical gentlemen who prescribed either of these two preparations, tell them exactly what was wanted? Blue pill and grey powder had been used from time immemorial for certain specific therapeutic purposes; it was possible that the preparations which in early days were used under those names were preparations of metallic mercury pure and simple, with, in the case of blue pill a variable quantity of certain organic matter, and, in the case of grey powder, of mercury, and of a certain quantity of chalk; but he ventured to say

that what the medical profession of the present day had to deal with was nothing of the sort. They were not able in the hospitals where they obtained their therapeutic knowledge to use preparations of pure mercury, but preparations of which they and the persons who had to dispense them often knew nothing, and they got results which in many cases he believed were due to the very presence of that quantity of mercurous or mercuric oxide which for the purposes of the discussion had been considered to be impurities. They did not know, in fact, whether the action which was supposed to be the proper action of blue pill was due to metallic mercury with a small quantity of organic matter, or to a small quantity of the oxide of the base. Nevertheless they had assumed, and rightly assumed, that, inasmuch as they were told to use metallic mercury and triturate it in both cases, the intention of the authorities had been to preserve that metal in the condition in which it was put in. Still he was not sure that the old therapeutic effect, as recorded by medical observers, was not due to the presence of a more or less quantity of mercurous or mercuric oxide. With regard to these preparations, therefore, pharmacists were not seriously behindhand; they wanted therapeutists who desired to have pure remedies, to state precisely what they wanted in either of those two preparations. The compilers of various pharmacopœias had followed on the lines of previous ones and assumed that the effect of the preparations intended to be exhibited was due in both cases to the presence of unoxidized metallic mercury. Of course, to Professor Redwood and his colleagues, who were engaged in an arduous task, his remarks might seen a little uncharitable. But he did not wish them to be so; all he wished was to suggest for the consideration of those who were responsible for the pharmaceutical preparations which would appear in an authoritative volume that it might be well to ask from their medical coadjutors what it was that they wished pharmacists to prepare and keep. He had a strong impression that a small quantity of one of the oxides of mercury in either case would give them all that they required, but of course that was not the province of pharmacists. However, one hesitated to accept these oxides in the light of true contaminations, because it was probable that they might be the therapeutic agents which medical men were looking for. This was perhaps a little out of order, but it was fair to refer to it in face of the fact that it was perfectly notorious that in the case of grey powder results were so uncertain,—in some cases so dangerous, and in others so beneficial,—that it was impossible to account for those results, except on the assumption that there was either a different ingredient or a different preparation of it employed. It was quite possible that a small proportion of mercurous oxide might be perfectly harmless, or, on the other hand, it might be the therapeutic agent, but in either case the quantity of that agent was of the highest importance. If it were possible to persuade medical men to examine on systematic lines what they wanted in these two preparations pharmacists would undertake to prepare them accordingly.

The vote of thanks was then passed to Mr. Senier.

The PRESIDENT said beside the specimens of drugs, etc., on the table, there were two or three pieces of apparatus useful in the process of extraction, especially the extraction of drugs by hot and easily volatilizable liquids. Some time ago Dr. Thresh described his extractor which was now on the table; there was another which Mr. Symons had found useful; and, lastly, there was one supposed to be an improvement on both, which would be described by Mr. Waite.

Mr. WAITE said the extractor for continuous percolation shown by him was on the same principle as Dr. Thresh's, but more simple in construction. The apparatus consisted essentially of a single tube of suitable calibre drawn out at one end to a point, and fitted into the neck of a wide-bottomed flask, so that the point reached within a short distance of the bottom of the flask. At the side of this tube was a hole through which the vapour from the boiling liquid in the flask rose to a condenser, so that the condensed solvent fell upon the substance to be exhausted placed in the lower part of the tube and after percolating through it fell into the flask, where it was again vaporized and passed back as a vapour through the aperture above the marc.* Mr. Waite said he had found the apparatus answer very satisfactorily.

The PRESIDENT said this appeared a small matter, but it was one of these ingenious chemical contrivances which could only be appreciated by those who had to rig up apparatus, and which would explain itself on inspection. The operation of extraction on a small scale was becoming day by day more important to pharmacists, and any improvement in such apparatus would be highly appreciated.

Mr. HOLMES then drew attention to a variety of objects on the table, amongst which were the following:—

A fine series of British plants presented by Mr. White, of Clifton, amongst which were a number of rare species not generally seen in collections. A specimen of Mozambique opium, the drug being now cultivated with a view to supplying the Chinese market, to compete with Indian opium. At first the samples grown in Mozambique only contained about 4 per cent. of morphia, but this on being analysed by Dr. Paul was found to contain 9·8 per cent. The amount of narcotine had not been ascertained. A specimen of haddock liver oil, presented by Mr. Elborne, who said that the oil was prepared in considerable quantities in Aberdeen, and he feared it might be sold mixed with, or in substitution for, cod liver oil, which it somewhat resembled. A new importation of cinchona bark, the tree yielding it being a hybrid cinchona recently cultivated in the northern districts of South America: the bark contained about 6 per cent. of quinine. A fine specimen of Maltese elaterium. A specimen of loganin, presented by Mr. Dunstan, who had extracted it from the nux vomica plant. This specimen was unique. Also a specimen of pure curcumin, prepared by Mr. Ince in the laboratory. A specimen of pip-menthol prepared in America from *Mentha piperita*, an article which would probably come into commerce in competition with Japanese and Chinese menthol. A number of drugs from America, one of which, *Ephedra antisyphilitica*, is likely to come into use. Some bottles of oils, presented by the Japanese Commissioner, which appeared in the International Health Exhibition. One prepared from the *Camellia japonica* was very bland, and did not throw down any solid fat, and did not readily become rancid; having these qualities it was much used by watchmakers in Japan. Some of the other oils were remarkable for their drying properties, and were used for varnishes. Also three varieties of starch, of which an account was given in the catalogue of the Japanese department. One of them was interesting as being prepared from the common bracken; mixed with the juice of *Diospyros Kaki*, it was employed for joining pieces of paper, which when treated in this way did not show the line of juncture and were not affected by rain. Some samples of oil of limes sent by the Montserrat Company, to show the difference between the oil prepared by the cold process and by distillation.

The PRESIDENT said the collection of botanical specimens sent by Mr. White, of Clifton, deserved special notice. The Council had taken measures to carefully preserve for reference any specimens of British plants which might be contributed by members of the Society or others, and Mr. White, having seen this announced, had kindly sent up this important and valuable collection. The importance of making what might be called an encyclopædia of British practical botany was obvious, and to those who pursued botany for the love of it would be a source of great pleasure. The objects of the

* It will be seen that in its principal feature, the aperture in the tube above the marc but within the flask, Mr. Waite's apparatus closely resembles one described by Mr. Watson Will on p. 263 of the present number.

become pharmacists and pass examinations, but also to give them facilities afterwards for becoming accomplished members of society in general. This gift of Mr. White's assisted in that direction, and he hoped it would stimulate other gentlemen throughout the country to follow his example.

Votes of thanks were then passed to the donors of specimens and to Mr. Holmes for describing them.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual meeting of the above Association was held at the rooms, 22, Burlington Chambers, New Street, Birmingham, on Wednesday, October 29, when the report for the past year was received, fully discussed, and adopted.

The following were elected officers for the coming year:—Mr. Barclay, President; Messrs. Barlow and Perry, Vice-Presidents; Mr. Lucas, Treasurer; Mr. Thompson, Hon. Sec.; Mr. Wright, Librarian; and Messrs. Arblaster and Haydon, Auditors.

Amongst the agenda of the newly-formed Council a proposition was unanimously carried to the effect that early in November a social evening should be held, at which the President would give an address, and opportunity be taken to learn from students and others as to the needs of the town for evening classes in pharmaceutical subjects and the adoption of such means as shall enable the Association to become a real benefit to the members generally.

A grant of £10 was made for the purchase of new books, and after voting moneys to the Treasurer for benevolent purposes, and an honorarium to the Librarian for his useful services, the meeting terminated.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first meeting of the seventh session of this Association was held on the evening of Friday, 24th October, at 9.15. The President, Mr. W. S. Turnbull, occupied the chair.

There was a large attendance of members and friends, including Dr. Clark, Messrs. Gilmour, Mackenzie, Napier, Stephenson and Young, members of the Council of the North British Branch of the Pharmaceutical Society. The President of the Association announced the receipt of several letters of apology from gentlemen who were unable to be present.

The minutes of the general meeting of last session and of a special business meeting, held during the recess, having been read and confirmed, the President inaugurated the work of the session as follows:—

The President's Address.

With this night's meeting we begin our seventh session, and judging from the various subjects contained in the syllabus I will venture to say it promises to be a session characterized by its usefulness. It is a healthy sign of any society or association when by various means it seeks to develop its resources of strength. It gives evidence of internal life and earnestness, and I am glad to think this feature is not wanting in the Edinburgh Chemists' Assistants and Apprentices' Association.

My experience in selecting a subject upon which to address you at this time has been one of considerable difficulty. Subjects such as "Pharmaceutical Legislation," "Pharmaceutical Education," "The Progress of Pharmacy" and "The Relation of Pharmacy to Medicine,"—all choice subjects for an inaugural address,—have of late been so thoroughly well threshed out that it would be highly improper for me to enter upon any of these subjects, because I might unwittingly be led into the too frequent use of inverted commas, a mistake which, to say the least of it, is unpardonable. I at length came to the conclusion that it would not be entirely out of place to take a general survey of one or two inconsistencies associated with our every day work and I mean to-night to cut a little below the surface, to probe into our internal organization in order to ascertain whether or not we are the authors of our own troubles.

Perhaps you may be ready to say that I have made but a sorry choice of a subject and that the least said of our own shortcomings the better. Well, I will admit that the subject is not altogether an enticing one; but I believe it to be something akin to a necessity at times to have the light of criticism turned upon our work, because there is nothing I know of more conducive to a system of accuracy and certainty in any sphere of life than at regular intervals to take a clear, lucid, and intelligible review of what we have actually been doing.

First of all, then, let us go in search of the model pharmacist. Where shall we find him? Occupying a position, some one will say, equidistant between the doctor's boy in buttons and the fully equipped professor. But do we really find the model pharmacist here? I think not; we find one to all intents occupying the position assigned to a pharmacist; but on taking a peep into his sanctum sanctorum we find that he is not altogether a pharmacist, but a drysalter, a grocer, a perfumer, a physician, and also too often a commission agent. Fractions of all these trades and professions you will find within the four walls of a chemist's establishment in this enlightened nineteenth century.

Now I am not here to-night to pass judgment on the chemist for this acquisition of trades and professions not his own, but I most emphatically object to marshal my sympathies on the side of those who mourn over the loss of trade unjustly, as they say, snatched from them by unscrupulous grocers, drapers, drysalters, and co-operative associations. It may be argued that chemists have always eked out an existence by the sale of such articles as perfumes, brushes and combs, toilet soaps, etc. If such be the case we have no ground for complaint against outside pressure in the way of competition, and although it may be lawful to retain a hold of these branches bequeathed to us by our forefathers, yet it is not expedient, and would only be in keeping with the honour and dignity of pharmacy to throw off these accessories, for, beyond a meagre remuneration in £ *s. d.*, they are drags on the chariot wheels of our calling.

There was a time in France when barbers betook themselves to surgery, and for a while the two professions went hand in hand, so that you could get your hair cut and your finger amputated in the same shop. But after a time the surgeon barber found that in order to be successful in surgery he would require to give it his undivided care and attention; consequently, he threw away the scissors and stuck to the knife, and to-day I will defy you to get a toilet and a surgical operation performed in the same shop. Why, then, could not the British pharmacist follow in the footsteps of the French surgeon? Why should he still unblushingly avow his disregard for ethics?

I am afraid the whole secret is rounded in the one little word "money," and this leads me to speak of counter prescribing. You remember that Professor Attfield, in his address to the Pharmaceutical Conference at Southampton, strongly advocated counter prescribing, and Mr. Henry, in his inaugural address to this Association last year gave his opinion in favour of counter prescribing. With all due regard for the opinions of other gentlemen, I mean to-night to take a different view of the question.

The only argument of importance advanced in favour of counter prescribing is its necessity. I admit that to a limited extent only, it may be necessary, but after all it is only a necessary evil deserving and requiring to be discountenanced in order to be reduced to a minimum; and

even admitting the practice to be a necessity, I fail, for the life of me, to understand why it should receive a stimulus from our platforms, unless as a red-rag demonstration before the eyes of a discerning medical profession.

The question naturally arises, Is it the duty of the pharmacist to prescribe? Certainly not, it is entirely beyond his jurisdiction. He has followed no medical compulsory curriculum of training; the horrors of the dissecting room never intruded upon his peaceful dreams; neither did the groans of the suffering patient at any time cause him to start up from his midnight slumbers to the semiconsciousness of an awful responsibility. And owing to his superficial knowledge his diagnosis of disease must be of that speculating nature which is always uncertain, and besides being unsatisfactory to himself it does not enhance his reputation, even as a pharmacist. Better in this case to begin with the first lesson of knowing and doing well what we do know and knowing and eschewing what we do not know.

As a source of pecuniary remuneration counter prescribing is cultivated by the chemist and not so much as the lauded public benefice. No doubt a want of support in prescriptions in many cases tends to force the chemist to this illegitimate practice. But is it not simply the climax of foolishness to risk a battle against odds, and having so much at stake? And to my mind the most important question springs from this, viz:—How we stand in the eyes of the medical profession. Are we not, in practising this counter prescribing, alienating ourselves from those whose friendship and co-operation, at this perilous time, it is our paramount duty to secure. I say we are throwing away our allegiance to medical men, trifling with our *prestige*, and so reducing an ideal noble profession to the common every-day experiences of quackery and mere shop-keeping in the true sense of the word.

Why, may I ask, were pharmacists excluded from the Pharmacopœia Committee in the Medical Acts Amendment Bill, now defunct? Was it because of their meagre knowledge of pharmacy or their inability to act on the committee? No, this theory is quite untenable and a more sensible solution of the question would be that they were unable to command that respect from medical men which in all manner of reason they ought to deserve. There is another cause at work, the effect of which must prove disastrous. I refer to the specialty craze so rampant in our midst. Now this specialty craze and counter prescribing, unless guarded against, I believe are the rocks ahead upon which our pharmaceutical craft must eventually wreck.

In classifying this amongst our inconsistencies I am perfectly cognizant of the fact that I am treading on delicate ground, and many hearing me now may think that I am beginning to trespass on individual rights. Well, all that can be said is that the rights of an individual are not for one moment to be weighed against the rights of a community. What I hold is that when the rights of an individual are hurtful to the rights of a class they become wrongs and are deserving of the severest censure. I do not wish to be misunderstood in the definition of the word "specialty," for there are specialties and specialties. Such preparations as quinine, morphia and chloroform are specialties; but the formulæ for such are patent to the world, and if any firm or individual can excel in the preparation of such, the more honour to that firm or individual, and we cannot grumble if they make a monopoly and command the market. But it is those insidious proprietary articles prepared in the inner room, the door of which is marked "strictly private," that I take objection to. No doubt many of these so-called remedies come from abroad, most of them, I think, from America, but the great ravages these have made on legitimate pharmacy in that country ought to warn us in this to be on our guard in trifling with this system.

As regards pecuniary loss, and that is seemingly what most affects the British pharmacist of the present day, in giving encouragement to the sale of these preparations we are actually playing into the hands of our neighbours the grocers and the co-operative associations, who seem to take a delight in selling retail at prime cost and sometimes a little below it. Here is a sample taken from the advertising columns of one of our Edinburgh newspapers.:—Eno's Salt, 2*s.* 2*d.* and 3*s.* 9*d.*; Hop Bitters, 3*s.* 9*d.*; Fellow's Syrup, 3*s.* 6*d.*; Maltine, 2*s.* 3*d.*; Maltine with Peptones, 2*s.* 11*d.*

It is needless for me to say that chemists are unable to compete against such formidable opposition, and even if such articles are sold at the regular advertised prices the profit to the retailer is merely nominal, and independent of their being hurtful to dispensing they barely repay the retailer for his trouble. Some may be ready to say that the stores can never compete with pharmacists because of their inability to distinguish between the different qualities of drugs. But what education is required to sell proprietary articles? Are not Holloway's pills and ointment the same all the world over? And the public are shrewd enough at all times to distinguish between a genuine bottle of hop bitters and a counterfeit, so that in this respect the grocer's apprentice becomes a personage of as great importance in the eyes of the public as the scientific chemist who is brought down to the level of a mere trader and having been taught to preserve intact the dignity of his profession, no wonder if he proves himself an unsuccessful competitor as a trader. The quiet tenor of his life is altogether incompatible with the haphazard, go-ahead system of trading of the present day. And even at the risk of perpetuating the characteristic leanness of the apothecary he will devote his life to the service of science, and, to use the words of one of our respected Scotch pharmacists, "die in the odour of pharmaceutical sanctity;" while over his tomb shall be inscribed those words ominous, full of meaning, and able to draw the sympathetic tear from the eye of the passer-by—

"Born to be a man, but died a chemist."

There is another and a greater evil than any I have mentioned arising from the increase of those preparations. Doctors are beginning to prescribe them, beginning; nay, have already begun; and I question if less than 25 per cent. of the prescriptions written in Edinburgh are not for these. The majority of such prescriptions, of course, do not come to the chemist's establishment, but being written in English instead of Latin are easily understood by patients, who, induced by those glaring advertisements to which I have already alluded, find little difficulty and considerable profit in seeking the cheapest market. This mode of prescribing is indulged in even to a greater extent by country practitioners than by their town brethren. But circumstances often render it necessary to do so in their case: a want of faith in the village chemist, or perhaps a shadow of jealousy caused by the chemist doing a little on his own account in the way of counter-prescribing, in which case the doctor has always a supply of specialties on hand. Now I have heard it advocated that in order to minimize this evil we ought to fight those specialists with their own weapons. But this is an absurd idea, because we must remember that it is the common work-a-day chemist with the small business who is the greatest sufferer, and, unless he is prepared to spend a fortune in advertising,—a thing, he is utterly incapable of doing,—he will find his stock of specialties disappear very slowly indeed. I do not say but that the British pharmacist is capable of turning out quite as good and in many cases more reliable preparations than his foreign brethren. But what profit is this to the advancement of pharmacy? If he becomes a speculating patent medicine maker and vendor his education has miscarried, and if his scientific attainments are exercised only in the ferreting out of cunning devices, then he can no longer be looked upon as one likely to benefit his brother pharmacists. The question resolves itself into this, Shall we give countenance to a practice which threatens to deal a death-blow at legitimate dispensing

and pharmacy? Shall we encourage the manufacture and sale of these questionable preparations at the risk of losing a large share of the most remunerative and dignified part of our business?

This system is not confined to the rank and file of our calling, but respectable firms are the chief delinquents, and there seems even a little rivalry amongst wholesale houses as to who will turn out the largest number of cough mixtures, worm nuts, soothing syrups and such like articles, fitted alike to adorn the huckster's barrow and the elaborately polished show case on the chemists' counter.

The opinion is abroad that this new creation of things, or creation of things new, is only a satisfying of public demand. But were it not for those insidious advertisements, wherein the truth is twisted and deformed, too often supplanted by falshood, accompanying those nostrums, the public would not have sought after them; and although others than pharmacists have now taken to the manufacture of proprietary articles, etc., still they are only following out a policy which was begun by pharmacists, and now one new preparation seems only to pave the way for a dozen others to follow in its wake. By encouraging the sale of these specialties, then, we place ourselves in a false position. We must either prepare to take the field as traders, open for competition, *ad extremum*, or with less show of valour and more honour leave it to those whom we are unwilling to call opponents.

To every man his work is not only a divine precept but an essential manifesto for the happiness of a nation, and I do not think the true work of the pharmacist is in such an advanced state as to allow of his either taking to do with his neghbour's work or folding his hands in composure over his own. He has an unlimited field for the exercise of his knowledge; for although much has already been done in the way of refining and purifying pharmacy from the crudness which has so long accompanied it, still much work remains, and next in usefulness to the discovery of a new alkaloid is the improvement of some older formula either in its composition or manner of manipulation, so it would be well for us at times to remember that—

> "Labour with what zeal we will
> Something yet remains undone,
> Something uncompleted still
> Awaits the rising of the sun."

A number of carefully prepared extracts displayed on the counter of the late Mr. Squire, won for him the esteem of an eminent London physician, and so placed him amongst the first pharmacists of his day. Was not this a worthier offering at the shrine of pharmacy than any number of cunningly concocted nostrums? Just as the names of departed generals, such as Wellington, Napoleon, Cromwell, and Bruce, fire the spirit of chivalry within the breast of the soldier of to-day and incite him to deeds of daring, so should the memory of Liebig, Christison, Howard, and Squire, stimulate us to further exertion and make every one of us an earnest disciple anxious to benefit his fellow man.

It is to be feared the revolutionary spirit of the age is having an evil effect upon scientific research, and in order to keep pace with the time we are apt too often to see the work of the experimenter ending in speculative theories instead of fundamental truths.

You must pardon me if I here quote from the speech of one of those great men who honoured this city with his presence in April of this year. Professor Helmholtz, of Berlin, in his address to the students, speaking of the danger of constructing systems of doctrine out of possibilities and making these the basis of general observations, says:—"I saw what was needed, that there was a difference between practical men and theoretical scientists, and it came hard upon me to stay at the bedside of a patient and ask myself if all was right and if everybody had done what was his due, and I found that I could not answer myself these questions in the way I would have liked to have answered them, and, therefore, I thought that my first duty was to go and study the theory of life and the processes going on in the human body. . . . At that time there were many young medical men in the same position, and we began to doubt and to speak out our doubts and to see whether we could attain to a better knowledge, and during the last fifty years medicine has made more real progress than perhaps during two thousand years before that, and the cause has been that medical men began to look to the facts and, learning to criticize all theories in the severest way, to study nothing but facts and to seek truth only on the foundation of facts." And again he says:—"It is not medicine alone in which this kind of rationalism has done much harm; I see the same thing in many of our political theories and in other sciences, and what I wish to say is to warn you against this kind of rationalism and be true to the facts."

I think this experience and those weighty words of warning ought to remain as beacon lights before us, because I believe that research in the pharmaceutical world of the present day too much resembles the research of the physiologist of fifty years ago, too often founding a theoretical construction on an unstable basis.

The number of conflicting opinions on the same subject held by pharmacists who devote their time to scientific research is confirmatory evidence that, however praiseworthy their object in view, the success attending their work can only be measured by the one true test, viz., the number of facts brought to light.

There is another question of vital importance, more seriously affecting assistants and apprentices, a grievance which the most sanguine can never expect to see entirely removed, but which might be modified to a very great extent. The question of long hours of business has more than once been made the subject of agitation, but agitation has virtually failed to bring concession. It is not my intention to-night to go into details regarding this question, but simply to show the vast differences between the ideal and the real; there is such an immense chasm between our highest aspirations and our meanest doings that I am afraid it will never be bridged over. Go where you will the night is never too late to witness the chemist's establishment in full blaze, and there are even a few who, through having become so closely cemented to the world or convinced of the absolute necessity for carrying competition to its utmost limit, and envious, perhaps, of the petty confectioner or tobacconist, do not hesitate to utilize the greater part of the Sunday, ostensibly for the dispensing of prescriptions. But what is wanted in the chemist is more a spirit of independence and less that of humble servility, more freedom and less slavery, more licence to the buoyance of life which nature never meant to be subduced, and less assiduous fetish worship of what Yankees call the almighty dollar.

There is an antidote for every disease, and the hope that the panacea for all our woes would come in the form of legislation, so fondly cherished, has been suddenly blasted. The pleasant dreams of a new Utopia have melted into thin air. But after all it is not to be wondered at. The amended Pharmacy Bill, shorn of all its flowery pretensions for public safety and educational reforms, was nothing more or less than a request for monopoly, the bare idea of which is as gall and wormwood to a Radical Government. Here is what Mr. Daniel Frazer, in a lecture delivered to the Glasgow chemists in April of last year, says of the Act:—"Truly appearances are sometimes deceitful; it is not all gold that glitters. To my apprehension the weakness of the Bill lies in its having the appearance of grasping at a monopoly. It so nakedly demands additional protection for ourselves in carrying on our business that I feel sure that when it reaches Parliament this feature of it will lead to the wrecking of the Bill as a whole and to the sweeping away of some of the protection we now enjoy." The first part of Mr. Frazer's prophecy has been fulfilled

and who knows but that the second part was within measurable distance of being fulfilled. But the Poisons Bill has not been allowed to see the light, and pharmacists ought to be thankful that this is so, because I am convinced it would not have been of the least practical benefit to the pharmacist, however beneficial it might have been for the public, and might at some future time have stood as a barrier in the way of legislation of a nature more in keeping with the requirements of the pharmacist.

We must now take a philosophical view of our present position and wait until a more convenient time comes ere we can have our wrongs redressed; but at the same time let us beware lest we put too much trust in what Acts of Parliament may do for us and neglect our own duties.

I cannot go all the way with the man who says that education is the only lever by which pharmacy can be raised, because I believe it must be raised by a multiplication of levers, education no doubt forming one of them. No one will say that pharmaceutical education has not made rapid strides onwards within the last few years; still I do not think that anyone will disagree with me when I say that the business of the pharmacist was never before in such a mutilated condition.

There must be less living for appearances and more shoulder to shoulder work; this is a duty incumbent upon all of us who mean to devote our time during life to the profession upon which we have just entered to recognize this principle. And yet, after all that has been said, gentlemen, I take no pessimistic view of the future of pharmacy, but look forward with hope to the time when the bright blink of fortune will smile sweetly on the pharmacist; for I think that in the not far-distant future we shall witness the advent of a reformation in the pharmaceutical world, and the essential features of that reformation must be, first, that which Mr. Proctor, of Newcastle, recorded as his views some time ago, viz.:—A diminution in the number of pharmacists; second, a complete organization of those that remain. It matters little how that organization is brought about, whether it be the work of Associations or the work of the Pharmaceutical Society; but there must be created and made prevalent a feeling of unity and responsibility to each other, and zeal for a common cause; and third, the giving up of everything, however remunerative, which exerts a deterrent influence on the progress of pharmacy.

Many are the expressions of disapproval levelled against the Pharmaceutical Society, and although the Pharmaceutical Society may be too far in the clouds for the majority of us, still it is only by being universally supported that it can be brought to recognize the necessity for levelling down any inequalities and working in co-operation with and for the good of all classes of pharmacists. Therefore I hold it to be the bounden duty of everyone early to associate himself with the Pharmaceutical Society, and to contribute his share of support to an institution which will defend him when threatened by injustice, succour him in the hour of adversity, and extend to him a helping hand when he is brought face to face with poverty.

Mr. J. R. Hill, the Vice-President, in moving a vote of thanks to Mr. Turnbull for his interesting address, said that they were indeed indebted to him for bringing these subjects before them. He had much difficulty in remarking on the themes contained in the address, which actually bristled with debateable matter. With regard to the complaint so often made, that the Pharmaceutical Society did little to benefit pharmacists, he laid the blame not on the Society but on the chemists who did not support it, and who, forsooth, were the very men who complained the loudest. Were the Society more liberally supported it would exert an influence which at present it cannot command. Mr. Hill expressed the privilege he had of asking a few words of counsel from the members of the North British Branch who had honoured the Association with their presence.

Mr. Young said it afforded him much pleasure to be present at the opening meeting of the Association. He had listened with interest to the address now delivered. He congratulated the Association on having begun its seventh session. He was glad to see such a large gathering of members. The success of the Association had been very remarkable, and he understood that this session would not be behind its predecessors in point of interest and usefulness. He did not care to subject the address to criticism, but he could not take the same gloomy view of things as the President. No doubt there were evils, but these would be remedied in time. With regard to counter prescribing, he had a case a few weeks ago. A medical gentleman called: "I feel out of sorts this morning, give me something to put me right. What will you give me?" In a case of that kind, what *can* you do?

Mr. Napier was glad to be present at this meeting of the Association. He had been interested by the address delivered by the President. He was deeply interested in the work which the Association carried on, and wished it a prosperous career.

Mr. Stephenson congratulated the Association on having such a successful beginning of its seventh session. He was highly gratified to be present that evening. He would refrain from making remarks on the address, else he might be inclined to come down a little sharply on some things which had been said. He was always pleased to be present at these meetings of the Association.

Dr. Clark said that he did not give much study to political subjects, although he felt that it was very necessary that they should be studied. The President had spoken of the importance of facts. Facts were very important. but we cannot retain a tithe of the facts that are known. Behind the facts are principles, and we must get a firm grasp of these.

Mr. Mackenzie had come rather to listen than to speak. He would merely mention a fact. The chemist had still long hours. He hoped that the members of the Association would soon be able to meet an hour earlier than they did at present.

Mr. Gilmour said that the President had dealt with problems which past efforts had failed to solve. Proprietary articles were pushed with a persistency which was amazing. He assured the Association of the pleasure he had at being present, and hoped that the session would be a successful one.

Mr. Henry moved a hearty vote of thanks, which was unanimously passed, to the members of the North British Branch who had favoured the Association with their presence.

The President, having briefly acknowledged the vote of thanks passed to him, some business matters were transacted, after which the meeting terminated.

ANSWERS TO CORRESPONDENTS.

Waterproofing of Cloth.—H. L. wishes to learn the strength of the solution of acetate of aluminium used in the waterproofing of cloth.

Cloth Dressing.—Mr. F. P. Balkwill asks for information respecting a process or chemical which would so alter or coat the wool fibres of a polished woollen fabric as to prevent it becoming spotted by rain without injuring the polish of the material.

J. R. Hill.—Your wish has been complied with.

J. E. Taylor.—Sulphurous oxide.

E. H.—We are much obliged for the report, but do not think it quite suitable for publication in the Journal.

A. W. Forster.—Iris fœtidissima.

R. Fraser.—Ince's Latin Grammar (Baillière).

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Dunstan, Wetzler, Fryer, Anderson, Chaney, H. L., P. W. O.

I.H.E. 1884.

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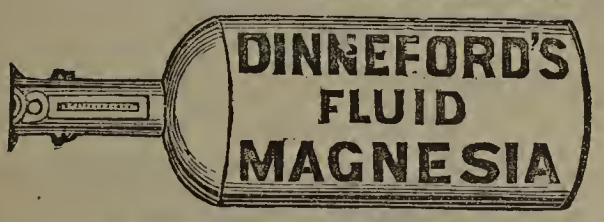

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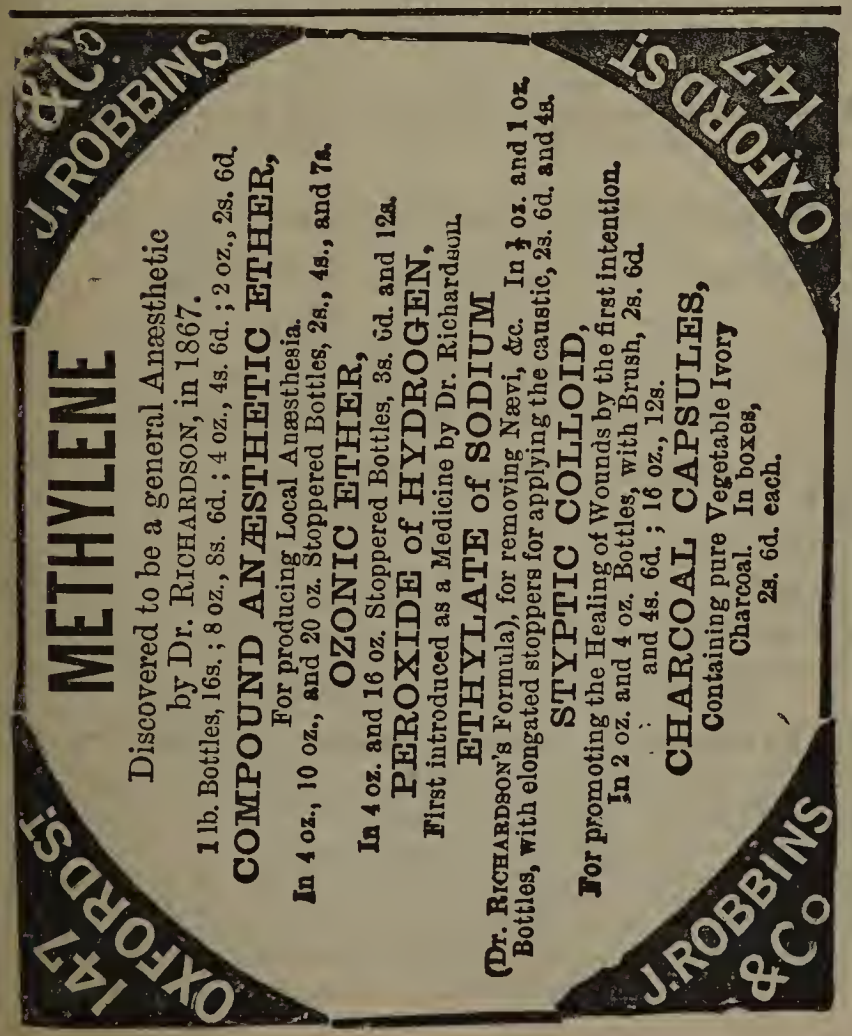

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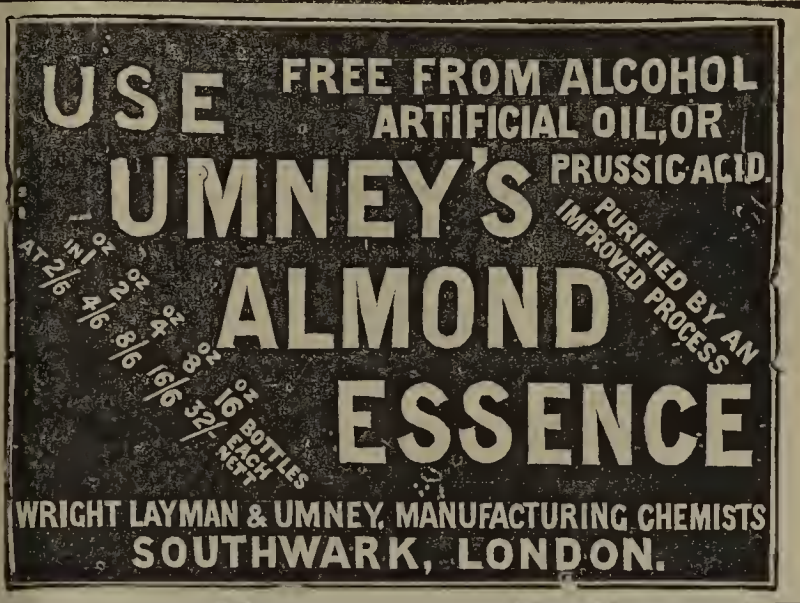

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MINOR.

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„ J. W. Bowes	„ J. W. Richards
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„ G. R. Ellison.....Whitby.
„ W. H. Fitzhugh.....Bedford.
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„ R. J. Marshallsay.....Wareham.
„ F. A. Monk.....Alton.
„ H. W. G. Morris.....Charlburg.
„ A. H. Norman.....Ely.
„ G. Phillips.....Dowlais.
„ H. A. Pimm.....Torquay.
„ H. Sara.....Falmouth.
„ J. H. Smith.....Coventry.
„ T. Topham.....Mirfield.
„ P. Tucker.....Exeter.
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SOUTH LONDON SCHOOL of PHARMACY

INSTITUTED 1ST OCTOBER, 1868.

325, KENNINGTON ROAD, S.E

Director : Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

SEVENTEENTH SESSION, 1884-5.

The next term will commence on the 7th January, 1885.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, Gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium, 100 Plants, 5s.

LIVERPOOL SCHOOL OF PHARMACY.
36, Oxford Street, Liverpool.

Principal : J. S. WARD, M.P.S., Ph. Ch.
(*Prize Medallist and South Kensington Prizeman.*)

RESULT OF THE OCTOBER EXAMINATIONS.

5 Minor men were sent in, 4 passed ; 1 Preliminary man was sent in, 1 passed ; viz. :—

Mr. W. H. HAYWOOD ... ... Liverpool.
„ A. C. OLDS ... ... Liverpool.
At the London Exams.
„ J. T. HORNBLOWER ... Birmingham.
„ GEO. LUNAN ... ... Banchory Ternan.
At the Edinburgh Exams.
„ C. F. PARKER (Preliminary) Liverpool.

Of these 5, 4 passed on their first attempt, the other at his second ; nor is this any new experience, for out of the last 9 that have passed from this School, 7 have been successful on their first attempt, and the other 2 on their second. To appreciate these figures it is necessary to compare them with the total results of the Examinations at both centres, which are—

In London, 105 were examined, only 34 passed.

In Edinburgh, 36 were examined, and only 15 passed.

Candidates for the January or February Examinations should enter at once. Next year's classes commence on January 6th, and several benches are already taken for the April Examination.

Prospectus, with full particulars of the School, sent free on application.

ENGAGEMENTS WANTED.

AS IMPROVER, in a good class business. Age 17. Height 5ft. 7in. 3¼ years as Surgeon's Dispenser. Good references. Disengaged. J. M., 2, Eden St., Kettering.

AS JUNIOR, in a good Dispensing business. 5 years' good experience in London and country. Age 22. Height 5ft. 8½in. Highest reference. CHEMIST, Shiplett, Weston-super-Mare.

EARLY in December.—As out-door ASSISTANT, in or near London. Age 23. Abstainer. First-class Dispensing experience. State salary and hours. FRANK HEBRON, Wellswood Pharmacy, Torquay.

AS ASSISTANT or MANAGER. 11 years' first-class experience in London and country. Minor and Apothecaries' Hall qualifications. Satisfactory references. DELTA, 18, Lambeth Rd., S.E.

BY advertiser.—As ASSISTANT. Age 31. Management of Branch business preferred. Good experience in all branches. Disengaged about the 20th inst. W. BANKS, 165, Edgware Rd., W.

LOCUM TENENS or ASSISTANT in emergency. Qualified. Over 30 years' experience. Town or country. W. C. TAYLOR, 6, Warbeck Rd., Shepherd's Bush, W.

LOCUM TENENS. Qualified. By the day, week or month. Town or country. CHEMICUS, 1, Princess Rd., Kilburn, N.W.

AS Managing ASSISTANT, or for Branch. Single. Age 38. Qualified. West-end and country experience. References unexceptionable. CHEMIST, Mr. R. A. Long, Sutton Parva, Warminster, Wilts.

AS ASSISTANT, where 2 or more kept. Age 23. Minor qualification. Good reference. ASSOCIATE, 2, High St., Brecon.

ENGAGEMENTS WANTED.

AS Traveller or Assistant, with view to travel for Drug House or Manufacturing Confectioner. Had some experience. Been 8 years with first-class Retail Chemists. Age 25. Highest references. A. Montpellier, B. Salterton, Devon.

AS Assistant in a Mixed country business. Age 23. Height 5ft. 3in. Good reference. Salary and further particulars from W. H. S., Cambridge Cottage, Meadrow, Godalming.

AS Junior, in a good Dispensing business. Preference given where time could be allowed for study. Age 24. J. R. G., 125, St. John's Hill, New Wandsworth, S.W.

AS Manager of a Branch. 8 years' London and country experience. Can Prescribe and Extract Teeth. Highest references. Abstainer, 3, Dungannon Ter., North End Rd., S.W.

AS Junior. Age 21. In Mixed business. Midlands preferred. C. J. H., 2, Worcester St., Kidderminster.

AS Junior. Age 21. Height 5ft. 8in. 7 years' experience. Good references. F. Robinson, 17, High St., King's Lynn.

AS Junior.—4 years' experience. Good references. Passed Preliminary. Height 5ft. 8in. Age 20. V. H. H., care of Thomas Hogg, Chemist, Bideford, North Devon.

ADVERTISER is seeking a situation (out-door) as Counterman. Bloomsbury preferred. 30 years of age. Height 5ft. 8in. E. Parsons, 59, Gt. Russell St.

MANAGER, or Assistant in good country business. Qualified. Certificates for Practical Dispensing and Materia Medica of Westminster College. Can Prescribe and Extract Teeth. Town and country experience. Highest references. A. P. S., Messrs. Hodgkinson, Stead & Treacher, 198, Upper Whitecross St., London, E.C.

AS Dispenser to a Surgeon or Chemist. Minor qualification. Age 31. C. M., 67, St. James St., Brighton.

TO Family Chemists.—A vacancy for a well educated youth as an Apprentice. Age 17. Tall, and has passed Preliminary. Midland Counties preferred. W. H. D., 34, Charnwood St., Derby.

AS Assistant or Manager. Long experience. Fully trustworthy. Good references and duly registered. T. E., 23, Netherfield Rd. North, Liverpool.

AS Manager, or out-door Assistant. Married. Age 32. Good Prescriber and Counterman. West-end experience. Permanency desired. Speaks French and German. Chemist, 24, Moreton Pl., Belgrave Rd.

LOCUM Tenens.—Mr. W. B. West, Staines Rd., Hounslow. Town and country experience, and for references a list of more than 50 former clients forwarded on application.

AS Junior, in London. Out-door preferred. Age 23. Good references. F. L., 9, Montpelier Rd., St. John's College Park, N.W.

PART-TIME Assistant, by a Chemist reading for Major. Near Westminster College preferred. Salary no object, but plenty of time required. Beta, Almora, Warren Rd., Torquay.

AS Manager or Assistant. Disengaged. Permanency desired. Minor qualification. Town or country. J. P., Mr. Blau, 29, New Bridge St., London, E.C.

AS Surgeon's Dispenser or Chemist's Assistant. Age 20. Height 5½ft. Passed Medical Prelim. Good Tooth Extractor, &c. Sheffield or neighbourhood preferred. References and photo. R. Greaves, 11, Oban St., Abbott's Rd., Bromley, E.

AS Manager or Senior, in a good house. Lengthened West-end experience. Age 39. Single. C. D., Mr. Howden, Chemist, 78, Gracechurch St., E.C.

ENGAGEMENTS WANTED.

IMMEDIATELY.—As Assistant or Manager. For permanency preferred, but would act as Locum. Good references. Good Prescriber and Tooth Extractor. Medicus, Gloucester St., Malmesbury, Wilts.

AS temporary Assistant or Locum Tenens, by the day, week, or month. Qualified, experienced, and reliable. Age 24. Height 5ft. 8in. Disengaged. H. S., 11, New Ormond St., London, W.C.

BY Advertiser, in the Wholesale Drug trade. 14 years' experience in the Retail. Good worker. First-class references. T. B., 89, Bishopsgate St. Without.

AS Manager or Assistant in charge. Good references. In or near London preferred. A. L., 4, Naval Ter., Sheerness.

WHOLESALE or Retail. Out-doors. Good experience in general Retail, also at Wet Counter in Wholesale. Age 28 years. Good references. S. B., 8, Brighton Rd., Stoke Newington.

DISENGAGED.—As Assistant, in London. Minor qualification. 8 years' town and country experience. Good references. Height 5ft. 6in. Beta, 231, High St., Lewisham, S.E.

AS Junior, in a first-class Dispensing pharmacy, London. Good reference. Age 19. Salary £30. F. Smith, Butter St., Alcester.

JUNIOR Assistant, in good Retail and Dispensing business. Age 20. Height 5ft. 10in. 5 years' experience in good class Dispensing and Retail. F. N., Belvidere House, Winchcomb St., Cheltenham.

BY the son of a French pharmacist, who has an English business, an appointment in a comfortable home, with London chemist, where he could learn English pharmacy. Applicant speaks a little English, thoroughly understands the French branch of the business, and has passed all the examinations of that country. Salary no object. Apply, by letter, to Evans, Lescher & Webb, 60, Bartholomew Close.

PARTIAL employment. In-door or out-door. Good experience in Dispensing and family Retail. Age 22. Personal reference given. Student, Mr. C. B. Allen, Pharmaceutical Chemist, Kilburn, N.W.

BY a registered Chemist and Druggist, a responsible situation as Manager. Good Dispenser and Prescriber. 23 years' experience. Married. A permanency desired. G. M., Messrs. Evans, Lescher & Webb, Bartholomew Close.

AS Assistant. Temporary or permanent. Age 30. Good general experience. Can Prescribe, Extract, &c. Abstainer. Good references. Gentian, 31, Rumford St., Hulme, Manchester.

OUT-DOORS, or to Manage. Age 30. Married. Good Dispenser and Prescriber, Extract Teeth. 16 years' London and country experience. Good references. Chemicus, 2, Cheltenham Villas, Weston-super-Mare.

ASSISTANTS WANTED.

A COMPETENT Junior (in-door), of good address and accustomed to a general country business Address (if convenient, enclosing carte, to be returned), stating age, height, and salary required, with references, or apply personally to P. Smith & Co., Chemists, 7, High St., Runcorn.

MEACHER & HIGGINS require a Senior Assistant. One accustomed to a good class Retail and Dispensing business. Personal application if possible; if by letter, state salary, height, and all particulars, and enclose carte. 105A, Crawford St., Montague Sq., W.

A QUALIFIED Assistant. Apply, with full particulars, to Glaisyer & Kemp, Brighton.

ASSISTANTS WANTED.

APPRENTICE.—C. PICNOT, Pharmaceutical Chemist, Strood, Rochester, has a vacancy for a well educated youth as an APPRENTICE. One who has passed the Preliminary preferred. Comfortable home insured and every facility given for thoroughly learning the business.

APPRENTICE.—In an old-established business. A youth about 16. In-doors. Comfortable home. Premium moderate. Apply to P. SMITH & Co., Operative Chemists, Wholesale Druggists and Dental Surgeons, Runcorn.

APPRENTICE.—A vacancy for a well educated youth (one who has passed the Preliminary preferred) occurs in an old established pharmacy. Time for study and recreation. Highest references given and satisfactory ones required. Apply to C. R., Messrs. Barron, Harveys & Co., Giltspur St., London, E.C.

APPRENTICE.—A well educated and gentlemanly youth as above, in one of the largest Dispensing establishments in the West-end of London. For particulars, apply to W. THOMAS, 103, Talbot Rd., Bayswater, W.

JUNIOR, accustomed to a light Retail mixed business, immediately. Apply, stating age, height, references, and salary required, to R. H. TREWEEKS, Chemist and Bookseller, Pembroke.

A DULY qualified Pharmaceutical Chemist, to conduct the business of a Branch Establishment in the town of Mallow, Co. Cork. He will have sole charge. Good references required, and a total abstainer preferred. Apply, stating terms, to Dr. ROCHE, 82, Grand Parade, Cork.

PARIS.—A Junior ASSISTANT, for Retail exclusively. Apply to EVANS, LESCHER & WEBB, 60, Bartholomew Close, London.

EARLY in February.—An ASSISTANT, in a good Dispensing and Retail business, in suburb of London. One desiring a permanency preferred. Apply, by letter only, stating full particulars to W. P. H., Messrs. F. Newbery & Sons, 1, King Edward St., E.C.

IMMEDIATELY.—A young man, about 20 years of age, for a brisk Retail and Prescribing business. Very little Sunday duty, and recreation allowed. Must have first-class references. Apply personally, to W. M. COVELL, Chemist, 302, Mare St., Hackney, London, E.

A GENTLEMANLY and experienced ASSISTANT, for a good country trade, in-doors. Highest references absolutely necessary. Apply, stating particulars of previous experience and other particulars, to A. D., Barclay & Sons, Farringdon St., London.

A SENIOR, in-door and permanent, not under 24 years of age, for a large Mixed Retail business. Must be a good all-round man. State age, height, and salary, &c., in applying. THOS. PARKER, 9 and 10, Bridge St., York.

PILL COMPOUNDER and COATER.—A firm of Wholesale Druggists in one of the principal towns in the North of England, require the services of a steady man as above. One able to coat with sugar preferred. Applications, stating experience and salary required, to be sent by letter only, to Z., T. Morson & Son, Southampton Row, London, W.C.

A JUNIOR, in-doors, of good address, accustomed to a good class Dispensing and Family business. Enclose carte (to be returned), stating age, height, and salary required, with last reference, to P. WILLIAMS, Pharmaceutical Chemist, Horsham, Sussex.

MANAGER for widow, with view to purchase. Age between 30 and 35. Light Retail and Dispensing business. Apply at once to CHEMIST, Messrs. Hill & Son, Wholesale Druggists, Southwark St., London.

ASSISTANTS WANTED.

IMMEDIATELY.—An active JUNIOR, of thorough business habits, and gentlemanly address. Must be a good Salesman and Prescriber. A comfortable home, and alternate afternoons for study, with one evening weekly and one day monthly. Salary commencing £30. Apply, with full particulars, enclosing carte, to SAMUEL THOMPSON, Thompson, Millard & Co., Limited, Curtain Rd., E.C.

AN ASSISTANT, active, with good references, about 24, to call upon Doctors, Chemists, &c., in London. One who has a connection as above preferred. Salary £100 per annum. A. Z., care of Housekeeper, 148½, Fenchurch St., E.C.

A COMPETENT ASSISTANT, not under 23 years of age, of good address and experience. Must have good references to character and ability. One with Minor qualification and desiring a permanency preferred. Apply (personally if possible), to W. BOWER, Pharmaceutical Chemist, 96, Tottenham Court Rd., London, W.

IMMEDIATELY.—A qualified ASSISTANT (married preferred), for Mixed country business, to live on premises, partly furnished. Good Prescriber and able to Extract Teeth. Must have undeniable references. Apply, stating full particulars, salary expected, &c., enclosing references and carte (returnable), to H. E. F., 6, Dover Ter., Old Trafford, Manchester.

A GOOD Junior ASSISTANT for a Dispensing business. Apply, stating age, experience, salary required, and enclose references to J. S. WARD, Pharmaceutical Chemist, 36, Oxford St., Liverpool.

A JUNIOR or IMPROVER. In-doors. For a good country business. Must be steady, willing and obliging. Apply, with full particulars and references, to G. W. SHACKLETON, Chemist, Abergavenny, Monmouthshire.

IMMEDIATELY.—An out-door ASSISTANT for the Wholesale department. State age, height, references, and enclose carte, to HICKS & Co., Cardiff.

FOR the Provinces.—Trustworthy man with knowledge of Drug and Oil trade, or Druggists' Sundries and Patent Medicines, to check off stock and assist with correspondence and getting up orders. Permanent situation to a competent hard-working man. Apply by letter, stating age, salary required and references, to A. B., care of Bourne, Johnson & Co., 35, Castle St., Holborn London.

IMMEDIATELY.—A competent ASSISTANT for a medium class trade. No Sunday duty. Minor qualification preferred. Out-door. Permanency. Apply, personally, if convenient, or by letter, stating full particulars, with references, to F. WASTIE, Kennington Cross, London, S.E.

AS ASSISTANT by the 1st of December, a man of good experience and capability. In-door. Apply, stating age, salary required and references, to A. J. EVANS, Chemist, Dorchester, Dorset.

JUNIOR in light Retail and Dispensing business. One seeking a permanency preferred. Apply personally, or send full particulars as to age, height, salary, &c. R. S. BATHE, Chemist & Dentist (opposite Holland Park), Notting Hill, W.

A COMPETENT ASSISTANT, about 24, of gentlemanly address, for a good class Dispensing business. State height, salary, with all particulars, please enclose photo (which will be returned). Apply, to Mr. BLADES, 10, Gloucester Rd., South Kensington, S.W.

J. B. LANCASTER, requires a competent ASSISTANT, accustomed to good class Retail, Dispensing and Prescribing. Apply personally, or if by letter, with carte, stating age, full particulars and salary. 2, Osnaburgh St., Regent's Park, N.W.

ASSISTANTS WANTED.

CHEMIST and Dentist, as MANAGER for a widow. Qualified in both branches and possessing mechanical knowledge preferred. In-door. Must be sober and have good references. Apply, with all particulars as to age, height, salary, &c., enclosing carte, to ARTHUR PEAKE, Chemist and Dentist, Earlestown, Lancs.

AN ASSISTANT, with Minor qualification, for a Dispensing and Family business. Must be a good Dispenser and have been used to a good class of trade. Apply, stating age, salary required, experience, and references, to JNO. HALLAWAY, Pharmacist, Carlisle.

APPRENTICE.—A well conducted youth, for a good Mixed country business. Time for study. Comfortable home. Work light. Small premium. A Major or a Minor Assistant kept. Address, Mr. T. RANDALL, Pharmaceutical Chemist, Wareham, Dorset.

BUSINESSES FOR DISPOSAL.

LIVERPOOL.—Immediately. Handsome corner shop, in leading thoroughfare. Well stocked and fitted. Good Prescribing and Dispensing BUSINESS. Average takings £17 per week. Easy terms of purchase may be arranged. Particulars on application to VERAX, Evans, Sons & Co., Liverpool.

IN the centre of the City of Lincoln, opposite the Chief Post Office, in Guildhall Street, an old established Retail Chemist and Druggist's BUSINESS. For terms and particulars apply to Mr. ALFRED WALTON, 15, Whitecross St., Cripplegate, London, E.C.; or Mr. W. T. PAGE, Jun., Solicitor, Lincoln.

WANTED a PARTNER in a Patent Medicine business in a large town in Yorkshire. Well established. Must be able to invest £500. Full particulars on application. Address, in first instance, to A. C. WOODHEAD, Accountant, 2, Upper Fountaine St., Albion St., Leeds.

YORKSHIRE.—Old established Retail and Prescribing BUSINESS, in a good agricultural town. Spendid position. Good reasons for disposal. Will bear the strictest investigation. Price for cash £300. Apply, J. G. JOHNSON, Chemist, Cheapside, Barnsley.

SOUTH Wales.—An old established genuine Drug BUSINESS, with immediate possession. Through death. Fair receipts. Shop well fitted (mahogany). Good house and garden. A rare opportunity for anyone wanting a business in a good agricultural district. For further particulars apply to W. E., Victoria Pl., Crickhowell.

HANDSOMELY fitted shop, in S.E. district. Only lately opened and already more than paying expenses. At valuation of stock and fixtures. Owner must sell. This is a rare opportunity for one about to commence business. For further particulars address W. J. B., Wright, Layman & Umney, Southwark.

IMMEDIATELY.—Profitable London Retail, PRESCRIBING. Doing over £5 weekly. Has done treble; been neglected. Genuine reasons for selling. Price £200. Worth double. Fittings superior, and large stock. Any reasonable proposal will be accepted. First genuine applicant will do. Business only wants seeing. F. CAIRNS, Post Office, Eastbourne.

LONDON (suburb).—First class BUSINESS, with opening for Dentistry. Returning £825. Long lease. Rent £50. Well stocked and elegantly fitted. Large house, garden and back entrance. Price £700 cash. G. T., Mr. Davis, 15, Henning St., Castle St., Battersea, S.W.

A GENUINE country Druggist's BUSINESS. No opposition. Satisfactory reasons for leaving. Returns nearly £700. Rent £30. Short lease if required. Price £400. Apply, by letter, to HENRY GEORGE, Newark.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for transfer:—DORSET. First-class Retail and Dispensing business. Returns £1350. Net profit £500. Rent £40. Year's returns. SOMERSET (Coast). Partner wanted. Good class Dispensing trade. £200 for half-share. GLOUCESTERSHIRE. Death vacancy. Retail, Dispensing and Prescribing. Same hands 40 years. Returns £750. For £650, or offer. DEVON (Coast). Good class Retail and Dispensing. Returns £750. For £600. SURREY. First-class Dispensing trade. Showing £530 net profit; increasing. For £1250. LONDON, N.W. Commanding corner Retail and Prescribing trade. Returns £400. Neglected. For £350, or offer. N. Old established Retail and Dispensing trade. Returns £800. For £650. Strictly reliable. S.W. Dispensing and light Retail. Returns £1100. Profits large. For £950. N.E. Well fitted but neglected trade. Returns £8 weekly. For £250. Please apply, 30, Jewry St., Aldgate, City.

PARTNER wanted in a first-class Dispensing and light Retail business in large town, South of England, having an Aërated Water Factory in conjunction, but quite distinct. Drugs return £1000 and Waters about £2000. Joint supervision or entire management of Drugs. Estimated value of stock, fittings, plant, vans, horses, &c., £3500. Half-share £1500 to £1700. Principals only. Apply, PARTNER, 59, Petherton Rd., Highbury, N.

LEICESTERSHIRE.—Unopposed village RETAIL. Returning in strictly light Retail, Prescribing and Dispensing £400 per annum. To a man accustomed to Agricultural trade and Horse and Cattle Medicines returns could be doubled. Vendor having accepted an engagement will take £100 cash and balance by easy instalments. This is a chance that rarely occurs. F. J. BRETT, Leicester.

CHEMIST'S.—In a large manufacturing town. Doing £12 to £13 a week. Low rent. Nicely fitted. Must be sold. A great sacrifice. No reasonable offer refused. £325. Apply, C., care of Mr. Brown, Solicitor, Dewsbury, Yorkshire.

IMMEDIATELY.—A good general and Dispensing BUSINESS, in a Cathedral city in the Midland counties. Returns about £1700 per annum. Address, Messrs. BARRON, HARVEYS & Co., Giltspur St., E.C.

LONDON suburb, N.W.—A good class Retail, Dispensing and Prescribing BUSINESS, situated in main thoroughfare. The business is improving and has good scope for further development. Good house and shop at moderate rental. Price £550. Address, PHARMACIST, care of Messrs. Maw, Son & Thompson, 11, Aldersgate St., E.C.

NEAR London.—Sound and increasing BUSINESS. Returning £1100. Rent free. Excellent dwelling house. Well fitted. Amply stocked. Price £1050. N. Splendid corner. Returns £900. Low rent. Price £1000. HANTS. Returns £1000. Selling through illness. First fair offer taken. Will bear the strictest scrutiny. HINE GILBERT & Co., 17, Hart St., Bloomsbury Sq.

FOR SALE.

ONE 4ft. nest of mahogany fronted Drawers, 20 drawers in number, with glass knobs and gold labels, £2; 5ft. ditto, £2 12s.; 6ft., £3; 8ft., £4; 12ft., with 60 drawers, £6; 6ft. Spanish mahogany Dispensing Screen, very handsome, £7 10s.; a 4ft. upright Case, as A 54, £3; a 5ft. mahogany Wall Fitting, as A 85, £6 10s.; a 4ft. Wall Case, as A 87, £4; Writing Desk and Case, as A 32, £3; 6ft. plate-glass Case, as A 18, £6; plate-glass Tooth Brush Case, £1 10s.; a very handsome Spanish mahogany plate-glass Wall Case, 6ft. long, as fig. A 88, £20; and a quantity of Cornicing, Pilaster and Shelving, all very cheap. BYGRAVE, 12, Curzon St., Wenlock St., New North Rd., Hoxton, London, N.

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Businesses thoroughly investigated for Buyers.

Purchasers have, at this agency, the advantage of about **300** Businesses to select from, requiring from £100 to £3000 capital.

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SOUTH OF ENGLAND.—Old established BUSINESS, in best position of good town, business has been much neglected and can be greatly increased, returns £850, of mixed character, of this £500 are Drugs, price to be arranged and part can remain.

SOUTH COAST.—Dispensing, Prescribing and light RETAIL, returns £500, good house and shop, price £450, or offer.

HOMŒOPATHIC.—Through death, a small business for disposal, in Leicester, position good and an exceptional chance for young man of limited means, net profit £100, there is only one other homœopathic chemist and three medical men, price £120.

YORKS.—Village TRADE, in thickly populated district, returns now £10 week and sure to increase, good reasons for sale, price £300, or valuation.

LEICESTER.—Retail, Dispensing and PRESCRIBING, returns £1270, price £500, part can remain.

LONDON, N.W.—Good Prescribing and DISPENSING, excellent position in main road, returns as branch £500, and capable of much increase, price £500, or small goodwill and valuation.

DURHAM CO.—General RETAIL, returning under management last year £875, for a pushing man fine chance, price £400, or valuation.

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Victoria Chambers, 55, Chancery Lane, London.

MR. VIZER has the following businesses, among others, for sale :—

LONDON, N.—Handsomely fitted PHARMACY. Price £500.
Another. Price £750.

LONDON, W.C.—Through illness much neglected. Capable of great development. Price £300.

WILTS.—First-class Family BUSINESS. Price £550.

DORSET.—Family Retail and DENTISTRY. Price £850.

LANC.—Small local WHOLESALE. Price £900.

ASSISTANTS' REGISTRATION DEPARTMENT.

Employers and Assistants should send full particulars of requirements, with Registration Fee, 2/6, *Postal Order.*

WANTED TO PURCHASE.

PARTNERSHIP in a good class Drug Business where £600 to £700 would give good return. Several good Proprietary Articles. Address, X., care of J. L. Varder, West St., Ashburton.

CHEMISTS' TRANSFERS.

32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

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N.B.—No Charge to Purchasers.

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1. LONDON, N.W.—Good class increasing BUSINESS, situate in main road. Returns at present over £500 yearly. Good house, easily let off. Price £450. Terms of payment £200 on entry, the remainder by instalments.

2. LONDON, S.E.—Good class Retail and DISPENSING Returns at present £9 per week; increasing. Large shop, well stocked. Good house; low rental. Price £400. Open to an offer.

3. SURREY.—Within an hour's journey of London, in a very pretty locality. Good class Retail and DISPENSING. Opposition nominal. Returns over £700. Large double-fronted shop, very attractive. Good house; low rental. Vendor having purchased a larger business will treat upon liberal terms.

4. SOUTH COAST.—Good class Retail and DISPENSING, with Post Office attached. Returns over £800. Large shop, well stocked, and very attractive. The business can be much increased. Good house, well situated. Price about £800. Part can be paid by instalments if wished.

5. SUSSEX.—Good country town. Retail and DISPENSING. Returns £500 yearly, with large profits. Double-fronted shop and convenient house. Good opening for a Dentist. Splendid garden, overlooking the sea. Price £450.

6. NORFOLK.—A very old established country BUSINESS, of good class. Returns over £1200 yearly. Several Proprietary Articles, which have not been pushed. Large shop, good warehouses, and good house, with large garden attached. Rent low. Terms valuation. No premium for goodwill.

Other businesses, town and country. Particulars free on application.

VALUATIONS.

Terms for valuation on application.

Appointments for November should be made early.

ORRIDGE & CO.

32, Ludgate Hill, E.C.

Allen & Hanburys'

MALTED FARINACEOUS **Food** FOR INFANTS AND INVALIDS.

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AND
Transactions.

THIRD SERIES, No. 751.] SATURDAY, NOVEMBER 15, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

Page

Pine or Forest Wool. — Wald-Wolle. Laine des Bois. By Thomas Greenish, F.C.S., F.R.M.S. 381

Cultivation of Cinchona in Bolivia. By Minister Gibbs 383

Substances Accompanying Benzoic Acid prepared from Gum Benzoin. By A. Jacobsen 384

Estimation of Morphine in Opium. By V. Perger 384

Rectification of the Registers of Pharmaceutical Chemists and Chemists and Druggists. List of Names liable to Erasure 385

EDITORIAL ARTICLES AND NOTES:—

Opening of the Society's New House in Edinburgh 389

Rectification of the Register..... 390

Notes:—Mr. Warton and Patent Medicines—Medical Inconsistency respecting Dispensing — Coloured Fires and the Explosives Act — New Chemists' Club in Dublin—A Curious Offence — Bark from Ceylon—The Humours of Quarantine—Meetings 390

DINNER OF SCOTCH PHARMACISTS on the Occasion of the Opening of the New Premises of the Pharmaceutical Society in Edinburgh..... 391

PHARMACEUTICAL SOCIETY OF IRELAND:—

Meeting of the Council 398

PROCEEDINGS OF SCIENTIFIC SOCIETIES:—

Chemical Society 398

PARLIAMENTARY AND LAW PROCEEDINGS:—

Fatal Explosion whilst preparing Coloured Fire 399

PHARMACY ACT, 1868.

IMPORTANT NOTICE.

The REGISTRAR *appointed for the purposes of this Act has exercised the powers given by Statute for the purpose of enabling him to keep a correct Register, and in so doing has, at intervals of six months, sent notices by registered letters to the persons, and at the addresses appearing in the list at pages* 385–388.

The clause in the Statute under which the notices have been sent is the following:—

"*It shall be the duty of the* REGISTRAR *to make "and keep a correct Register, in accordance with "the provisions of this Act, of all persons who "shall be entitled to be registered under this Act "and to erase the names of all registered persons "who shall have died, and from time to time to "make the necessary alterations in the addresses "of the persons registered under this Act; to "enable the* REGISTRAR *duly to fulfil the duties "imposed upon him, it shall be lawful for the "*REGISTRAR *to write a letter to any registered "person, addressed to him according to his address "on the Register, to inquire whether he has ceased "to carry on business, or has changed his residence, "such letter to be forwarded by post as a registered "letter, according to the Post Office Regulations "for the time being, and if no answer be returned "to such letter within the period of six months "from the sending of the letter, a second, of similar "purport, shall be sent in like manner, and if no "answer be given thereto, within three months of "the date thereof, it shall be lawful to erase the "name of such person from the Register; provided "always that the same may be restored by direc-"tion of the* COUNCIL OF THE PHARMACEUTICAL "SOCIETY, *should they think fit to make an order "to that effect.*"

In no instance has the REGISTRAR *received any reply, and in nearly every instance the letters have been returned through the Dead Letter Office.*

The names of all the persons appearing in the list will be erased from the Register on December 31*st next, unless the registered persons communicate with the* REGISTRAR.

The attention of LOCAL SECRETARIES *is especially directed to this notice, as they may, by timely intimations to any of the registered persons known to them, render to those persons important service.*

RICHARD BREMRIDGE,
Registrar.

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, December 3rd, 1884, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at half-past 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 26th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

CATALOGUE OF THE MUSEUM.

The Catalogue of the Museum may be obtained from the Secretary, price 2s.; or by post, 2s. 4d. Each Member, Associate, and Apprentice of the Society will be supplied with one copy *gratis*, on application to the Secretary.

INDEX TO THE PHARMACEUTICAL JOURNAL FROM JULY, 1868, TO JUNE, 1878.

An Index of the ten Volumes of the *Pharmaceutical Journal*, from July, 1868, to June, 1878, may be obtained from the Secretary, price 2*s.* 6*d.*, or by post, 2*s.* 8½*d.* Each Member and Associate of the Society will be supplied with one copy *gratis*, on application to the Secretary.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the second Tuesday in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 5th day of December next, at 12 o'clock precisely.

By order of the Council,

RICHARD BREMRIDGE,
Secretary and Registrar.

October 1st, 1884.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

LIBRARY AND MUSEUM.

The Library is open daily from 9 a.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.) The Museum is open daily from 9 a.m. until 5 p.m., and from 7 p.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.)

Members, Associates, and Apprentices residing in the Provinces, may obtain books from the LIBRARY on application to the Librarian and payment of carriage one way.

SPECIAL NOTICE.

The following books are missing from the Library:—

Attfield's Chemistry, 9th ed., 1881.

Bentley's Manual of Botany, 4th ed., 1882.

Hardwich's Manual of Photographic Chemistry, 9th ed., 1883.

Martindale and Wescott's Extra Pharmacopœia, 3rd ed., 1884.

Members, Associates, and Apprentices are invited to examine their Libraries, and if any of the above-mentioned works be found therein, to forward such work or works to the Librarian of the Society.

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The Society's Rooms at 119A, George Street, Edinburgh, are closed. All communications should be sent to the new premises, 36, York Place, Edinburgh, which are now open.

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

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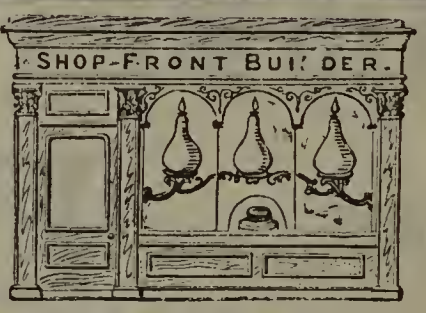

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Respectively 8 and 4 times the strength of the Spirit.

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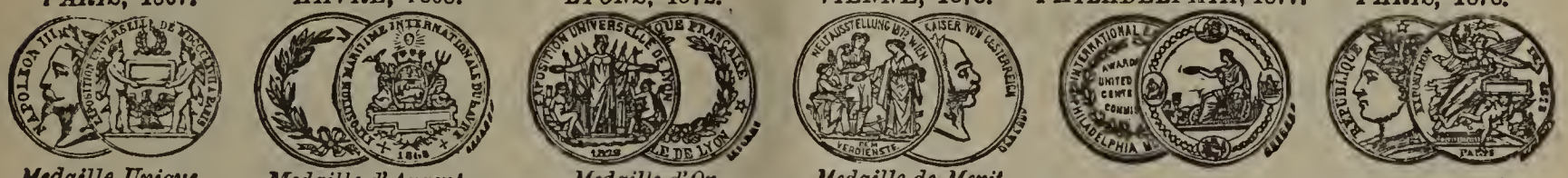

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NEPENTHE.

FERRIS & CO. *v.* GOODMAN.

Notice is hereby given, that by an Order of the Chancery Division of the High Court of Justice, made the 18th day of July, 1884, in the above action, it was ordered that the Defendant and others be **perpetually restrained** from selling, or offering for sale, any formula or recipe for **"Nepenthe,"** and from otherwise prejudicing the sale thereof by, or injuring the title thereto, or Trade Mark therein, of the Plaintiffs, Messrs. FERRIS & Co., of Bristol, Wholesale Druggists, the **Registered Proprietors thereof.**

And it was further ordered that the Defendant do pay the costs of the said action.

Dated this 12th day of August, 1884.

(Signed) CHILTON & GREEN-ARMYTAGE, Bristol,
Solicitors for the said Plaintiffs.

SQUIRE'S CHEMICAL FOOD

[*Syrup. Ferri Phosph. Comp.* (*Squire*).]

History. This agreeable preparation was originally introduced by the late Professor EDWARD PARRISH, about the middle of the present century; he subsequently much improved his original formula.

In its present perfected form the sole right of manufacture has been acquired by Messrs. SQUIRE, who have for many years acted as Professor Parrish's Agent in this country.

Properties. It is a complex solution of Iron, Lime, Soda, and Potash, in a Phosphoric Syrup (*containing the Iron in the Ferrous condition*). It thus contains no single substance which is not a constituent of the blood and tissues, and therefore may be administered daily for a lengthened period.

Uses. Physicians have prescribed it for the last twenty years more extensively than any other preparation of the kind. They have found it useful in a great variety of maladies, and especially suitable as an addition to the diet of delicate children, and in all cases of pallor and general weakness in adults as well as children.

SQUIRE, Chemist on the Establishment in Ordinary to the Queen,
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No. 2, at a price which will enable the Towel to be used by all classes, and which is the amount usually expended in washing alone, viz.—

ONE SHILLING PER PACKET OF ONE DOZEN;

Wholesale, 10s. per gross to a/c.

New Circulars are ready for general distribution; also new Show Cards.

For protection against useless and injurious imitations each packet bears the Signature of the Patentees.

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SILVER MEDAL, PARIS, 1878.

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PATENT PROCESS.

Samples and Prices of Jujubes on application.

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For Small Phials, **2s. 6d.** and upwards per 1000, according to size, style, design, and quantity.

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Special attention is called to the advantages of above, as, being made to screw on and off, are much easier to clean. Further Sizes and Prices in Catalogue.

Purchasers of Druggists' Sundries, Smelling Bottles, Hair Brushes, Combs, Sponges, Thermometers, Filters, and Boxes of all descriptions should pay a visit to our Showroom before purchasing elsewhere, in order to compare our prices and quality against other houses.

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WELCH'S FEMALE PILLS.
These are universally acknowledged to be the Genuine, and Druggists may safely recommend them.

CAUTION!

The Proprietors of Kearsley's Original Widow Welch's Female Pills find it incumbent on them to caution the purchasers of these Pills against various imitations by parties who have no knowledge of their peculiar preparation, the Original Recipe having been sold to the late G. Kearsley, of Fleet Street, whose Widow found it necessary to make an Affidavit, for the protection of her property, in the year 1798. The Genuine Recipe for **Widow Welch's Female Pills** has been prepared by them for **97 Years!** Chemists are particularly requested to remark that, as a testimony of authenticity, each bill of directions contains an Affidavit, and bears the signature of "C. KEARSLEY," in writing, also engraved on the Government Stamp, and each box is wrapped in WHITE paper.

1000 HANDBILLS, WITH NAME, AND TWO TIN SHOWCARDS,
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EACH fluid drachm contains 34.4 grains of Iodide of Iron.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms Syr. Ferri Iodidi of full Pharmacopœia strength.

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LIQUOR Calcis Lactophosph.

EACH fluid drachm contains 8 grains of anhydrous Calcium Phosphate combined with Lactic Acid.

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LIQUOR Ferri Phosph.

EACH fluid drachm contains 8 grains of Ferrous Phosphate.

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LIQUOR Ferri Phosph. Comp.

EACH fluid drachm contains, in addition to the alkaline Phosphates, 4 grains of Phosphate of Iron, and 8 grains of Phosphate of Calcium, dissolved in pure Phosphoric Acid.

ONE volume added to three volumes of *Syrupus, B.P.*, forms "Chemical Food."

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EACH fluid drachm contains 8 grains of Hypophosphite of Iron.

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On receipt of a Post Card, trial samples will be sent, carriage paid, to any address.

Detailed List, containing prices and particulars of upwards of thirty different combinations, post free on application.

FLETCHER, FLETCHER & STEVENSON,
Holloway, London, N.

PINE OR FOREST WOOL.

WALD-WOLLE. LAINE DES BOIS.

BY THOMAS GREENISH, F.C.S., F.R.M.S.

About the year 1840 a new and curious industry sprang up at a place called Humboldtsau, or the Meadow of Humboldt, situated near Breslau, Upper Silesia, which, like most novelties, had for several years to struggle with difficulties before it could be said that its position was established,—that, in fact, it occupied a place in the estimation of the public or was noticed by the medical profession. This industry consisted in the utilization of the acicular leaves or leaflets of the pine in the production of a substance to which the name "Wald-Wolle," rendered pine or forest wool, was applied; and it evidently extended itself, for there subsequently arose new manufactories at Remda in the Thüringen-Wald; at Jonköping in Sweden; Wageningen in Holland; as well as in some parts of France.

Schledel, in his 'Waaren-Lexicon,'* mentions this substance under "*Wald-Wolle*," and describes it as "the fibres of the needles of *Pinus sylvestris*, also of the black pine, *Pinus niger austriaca*, fabricated after the process introduced by Joseph Weiss, of Zuckmantel, Austrian Silesia. When prepared, it resembles horsehair, and has been used for stuffing mattresses, which purpose it seems to have fully answered, and the mattresses stuffed with it possess an aromatic odour. In the process of its manufacture a volatile oil is obtained called Wald-wolle-oil, or forest-wool oil, which is used as an external application in rheumatic affections. The Wald-wolle products can be procured in Berlin, Vienna, Leipzic, etc."

According to Hager,† Weiss used the fibre of the pine leaf in the manufacture of paper, and observed that those workmen who happened to be afflicted with gout or rheumatism were relieved by the application of the pine-needle products. Hence their introduction as remedial agents into medical practice.

Simmonds, in his 'Dictionary of Trade Products,' calls the article pine-needle wool or pine-wood wool, "a fibrous vegetable substance obtained in Prussia by treating the buds and leaves of coniferous trees with a strong solution of carbonate of soda. The fibre, so obtained, is used there for upholstery purposes, such as stuffing for mattresses, intended as a protection against insects, and also for wadding; blankets are made with it; and oil and soap are also obtained from it."

The term pine-*wood*-wool is incorrect, and confounds this with a very different article, called "Holzwolle," also of German origin, consisting of the pine wood reduced to a coarse fibrous powder, an article which impregnated with bichloride of mercury is now recommended as an antiseptic dressing in surgery.

In the *Journal d'Agriculture pratique*,‡ there is an article by Professor Charles Morren—mainly a translation from the *Bernische Blätter für Landwirthschaft*, January, 1852, "Note on the Vegetable Wool extracted from the Leaves of the *Pinus sylvestris*," of which the following is a summary:—In the neighbourhood of Breslau, in Silesia, in a property called the Meadow of Humboldt, there exist two establishments—one a factory where the leaves of the pine are converted into a kind of cotton, called pine or forest wool; the other an establishment for invalids, where the waters used in the manufacture of the pine wool are employed as curative agents, affording relief to the sufferers from rheumatism. Both of these owe their existence to Monsieur De Pannewitz, inspector of forests and inventor of a chemical process, by means of which there is extracted from the long and fine pine leaves a fibrous substance called forest wool, because it curls, felts, and can be spun as ordinary wool.

The wild pine, from which this wool is obtained, is much esteemed in Germany for its many valuable properties, and instead of leaving it to its natural growth, extensive plantations are cultivated, and the use Monsieur De Pannewitz has made of the leaves will contribute to extend the cultivation of the pine in other countries.

The acicular leaves of pines, firs, and conifers in general, are composed of a bundle of fine and tough fibres, surrounded and kept together by a resinous substance. Boiled with an alkali, the resinous substance is dissolved, when it is easy to separate the fibres and to wash and free them from all foreign substances.

According to the process employed and the leaves used, the woolly substance is of a fine quality or remains in a coarser state.

In the first case it is used as wadding—in the second for upholstery purposes.

The first use that was made of this filamentous substance, was to substitute it for cotton or wool wadding in quilted bankets. In 1842 the hospital of Vienna bought 500 of these blankets, and after a trial of several years a further supply was ordered. It was observed that under the influence of pine wool no noxious insects sheltered in the beds; it was found also that the aroma was agreeable to the occupants. Soon after the workhouse of Vienna was furnished with similar quilted blankets.

Similar articles, as well as mattresses, stuffed with the wool, have been used in the hospital of charity, in other hospitals at Berlin, and in the barracks of Breslau.

An experience of five years in these establishments has proved that articles made of pine wool are very useful and durable, never troubled with moths and only one-third the price of horsehair. Besides, it can be spun and woven. The finest quality gives a yarn resembling hemp and equally strong. Spun and woven as cloth it yields a fabric that may be used for carpets, horse blankets, etc. The exhibitors of these products were awarded a bronze medal at the Exhibition of Berlin, and a silver one at that of Altenburg.

Such is the account given by Professor Morren of the pine-wool productions, but I am informed that the quilted blankets referred to by him are not now used in the Vienna Hospital, straw having superseded the pine wool as a stuffing for mattresses.

Bentley* says:—"From the leaves of this species (*Pinus sylvestris*), the substance called pine wool or fir wool is prepared. It is used for stuffing mattresses, etc., and is said to be repulsive to vermin. Wadding for medical use, and cloth for various articles of dress, etc., are also manufactured from these leaves."

Martindale† thus refers to it:—"Fir wool or fir-wool wadding, obtained from the pine leaves, is sold as a brownish-yellow fibre, in sheets like cotton

* Sixth edition. Leipzic, 1850.
† 'Pharmaceutische Praxis.'
‡ Vol. v., 1852, p. 392.

* 'Manual of Botany,' 1882, p. 678.
† 'Extra Pharmacopœia, 1883, p. 216.

wool. It has a faint agreeable odour of the pine leaf, and is manufactured into blankets, jackets, spencers, stockings, etc."

The two last authors refer to the source of true pine wool, but describe an entirely different article.

In the 'National Dispensatory,' Stillé and Maisch refer to these products, and state that "the leaves of the different species of pine, when distilled with water, yield volatile oils, which differ from the volatile oils obtained from the resin of the same species. Such an oil is known, and to some extent employed in Germany as *Fichtennädelöl* (fir-leaf oil), and the leaves by pounding are converted into a fibrous substance known as *Fichten-wolle* (fir wool)."

I am indebted for samples of the true pine or forest-wool, wald-wolle, to M. Bernardin, Musée de Melle, Belgium, to Herr Dittrich, Prague, and to Dr. Maschke, in Breslau. I have also received two samples from S. Graetzer, of Carlsruh, the depôt for conifer preparations of Humboldtsau. These two differ in quality: the finer is labelled "adapted for coverlets," and the coarser for "stuffing cushions." This substance, more or less fine, and with a faint pine odour, constitutes the article known as Wald-wolle, pine or forest wool, throughout Germany and the Continent generally, and all authorities to which I have had access agree as to its origin, the pine leaf; its character, a fibrous substance; and the several uses previously enumerated, to which it has been applied with more or less of success.

Some eminent members of the medical profession on the Continent have spoken favourably of these pine-wool productions, but whether they deserve or not the high enconiums passed on them it is nevertheless an important fact that a material, before considered almost useless, is now converted into articles of domestic utility.

The several samples just referred to, more or less coarse, of a reddish-brown colour, as forwarded to me from those different sources, were subjected to a careful histological examination, and were found to be composed of the tissues of the pine leaf.

Fig. 1 is a transverse section of the leaf of *Pinus sylvestris*, and presents to the naked eye three very distinct tissues, *a*, the epidermal layer; *b*, the fibro-vascular bundles, composed of bast and wood cells; *c*, the parenchymatous chlorophyll tissue, with the oleo-resin secreting cells; and *d*, the parenchymatous tissue surrounding the vascular bundles.

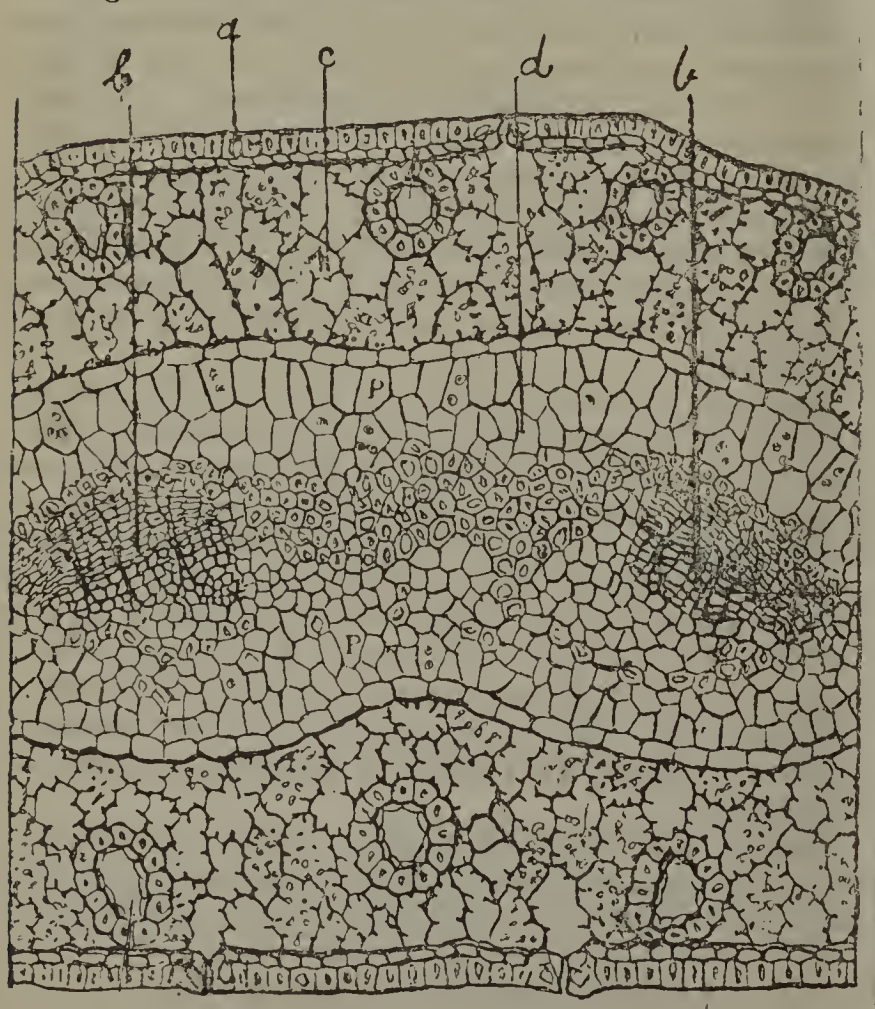
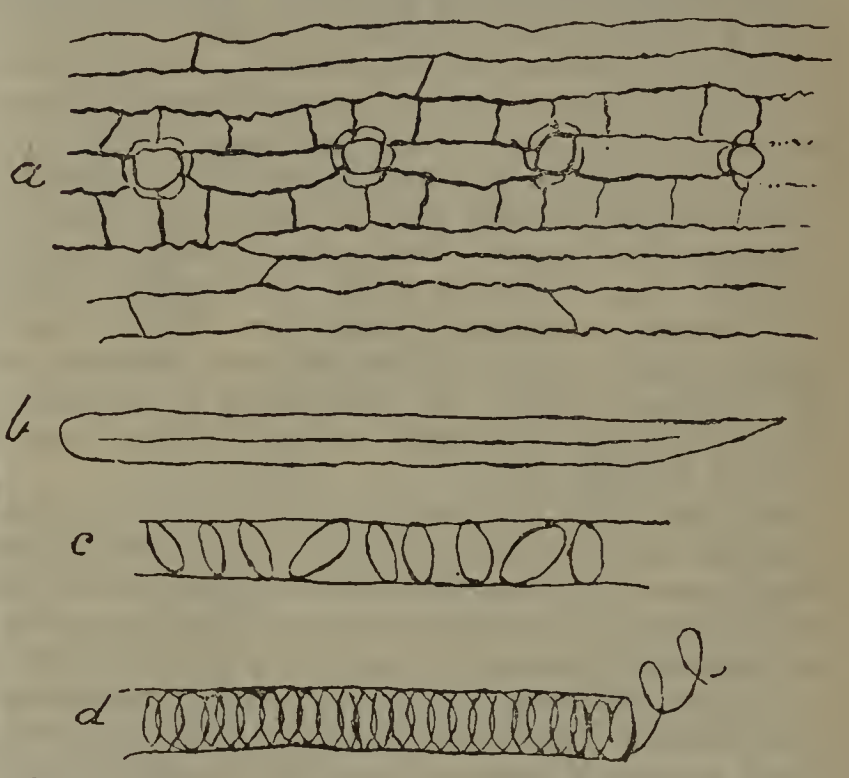


Fig. 2 shows the tissues of which these fibrous substances are composed. *a*, the epidermal tissue, a series of elongated cells alternating with a series of tabular cells, the latter containing the stomata; the side walls have an undulating outline, so that the adjoining cells fit into each other. The parenchymatous tissue within the epidermal layer and that surrounding the vascular bundles, fundamental tissue, being thin and delicate, is for the most part disintegrated and destroyed in the process for the preparation of the wool, leaving the more tenacious epidermal cell tissue (*a*) with the fibro-vascular bundles, represented by *b* the bast cell, and *c* and *d* annular and spiral vessels, as the component parts of this fibrous material.



The several tissues of each sample were found to correspond with those in the leaf of the pine; there was no tissue found that had not its counterpart in the pine leaf, and the pine leaf being equally examined had no tissue that was not present in the samples of this fibrous material.

It is therefore evident that this fibrous substance, to which the term pine or forest-wool was originally applied, and to which it now applies throughout Germany, the birth-place of the industry, is manufactured from the acicular leaves of one or more species of pine previously exhausted of its volatile oil and extractive in the process of boiling.

There is now in English commerce a fibrous article, in sheets like cotton wool, to which the same names of pine or forest wool, pine and fir-tree wool, pine leaf wool, are indifferently applied. Samples of this substance were obtained from different sources, but they so clearly corresponded that they pointed to one common origin. They were subjected to a micro-chemical and microscopical examination with the view of determining the true nature of an article which is just now, as a fibrous material, and also as forming textile fabrics, receiving more or less of attention from the medical profession as well as the public.

The samples were composed of fine fibres of a reddish-brown colour. When boiled in water the

colour was not affected. Boiled in a solution of caustic alkali a faint pine leaf odour was perceptible and the colour was partly discharged. A solution of chlorine completed the bleaching process, leaving a white fibrous material which was afterwards washed and dried.

A few threads only of the bleached fibres were used for the application of the following reagents:—

Chloro-iodide of zinc produced a violet tint. A solution of iodine, followed by sulphuric acid, gave a blue colour. The fibres dissolved completely in a solution of ammonio-oxide of copper. The results from these simple experiments were sufficiently convincing that the fibres in question consisted of pure cellulose, and not that altered or lignified condition of cellulose which the fibrous materials previously referred to show under the same reagents.

It will be understood that these experiments were conducted under the microscope, and that two or three fibres only were used on each occasion, so that the observer was enabled to follow the delicate reactions which were not visible to the unaided eye. The individual fibres were then placed under the microscope, aided by polarized light, and from their physical characters, which confirmed the results of the previous chemical reagents, it was evident that they were neither more nor less than the unicellular hairs on the outer coat (*testa*) of the seed of *Gossypium* which constitute ordinary cotton, whose habitat is not Thuringia, but rather the Southern States of America or one of the other cotton producing countries of the East, and that it owed its brown colour not to extractive from the pine leaf, but to the application of the usual dyeing material for that purpose. That peculiar epidermal cell tissue which characterizes the pine leaf was entirely absent.

In addition to this fibrous article now described, there is another material called "pine foliage forest wool flannel," hygienic flannel, also "from the forest of Thuringia," claiming public and professional patronage. It professes to be made from the fir wool, the produce of the Black Forest fir, *Pinus sylvestris*. This is a woven material of the same colour as that previously described. The warp was detached from the weft in order that they might be examined separately; the warp when the dye was removed corresponded in every respect with the fibre previously examined and behaved in a like manner with the same reagents; in fact it was cotton. The fibres of the weft were next examined. In burning they gave off that peculiar horny empyreumatic odour indicating an animal origin; boiled in caustic alkali they were completely dissolved; examined under the microscope the imbrications on the individual hairs proved previous suspicions to be correct, that this fibre consisted of wool. The woven material was, therefore, a combination of ordinary cotton and sheep's wool, the former probably rather preponderating.

These fibrous materials profess to owe their origin to the leaves of the *Pinus sylvestris*; but the venation of most of the Coniferæ is simple, one single unbranched midrib, and the only available true fibres are the fibro-vascular bundles of this midrib, which are surrounded by parenchymatous tissue. The fibro-vascular tissue of the midrib shows with the previously-mentioned reagents a distinct difference from that of cotton.

It would appear, then, that this "curious industry," consisting in the utilization of the leaves of the pine in the formation of a fibrous material called pine or forest wool, has given birth to another *curious industry*, which is endeavouring to attract the attention of the medical profession; the results of this investigation may assist in determining its true value as an addition to our remedial appliances.

CULTIVATION OF CINCHONA IN BOLIVIA.*

BY MINISTER GIBBS, OF LA PAZ.

I have devoted some time and attention to acquire data and information relative to the next important article—cinchona bark, or quina—of which large quantities are exported yearly. Formerly it was gathered by the Indians, and in such a manner that large forests were destroyed, trees cut down, the bark taken in any way merely to make up large quantities; to-day the quina plantations, or, as they are called here, quinales, are cultivated and nourished with care and agricultural science, the principal planters being Germans—one, Mr. Otto Richter, possessing two million plants; the estate of Mr. John Kraft, a Hollander, lately deceased, two million.

The cultivation of quina in plantations, systematically, has been carried on for about seven years, hardly long enough to show all the advantages, as there is room for much study and improvement.

Mapire, about sixty leagues north of this place, or about five days' journey, has under cultivation about four million five hundred thousand plants; Longa, north-east of this city about twenty leagues, five hundred thousand plants; Yungas, east-north-east twenty leagues, one million plants; Guanay, east of Mapire, five hundred thousand plants; total, six million five hundred thousand plants.

Where the principal quinales are it is a very rough and broken country, the Andes being seamed and cut into deep valleys in every direction. The trees are planted on the sides of the valleys or ridges in altitudes of about 3000 to 4000 feet above the sea. They will grow higher up, even to 8000 feet, but are stunted, and will give little or nothing of what is called here the quina salt. The plants want a great deal of sun, heavy rains and fresh winds.

I have conversed with three of the principal superintendents of the large quina plantations—all Germans—and they say that the cultivation of quina is yet in its infancy, and there will be many improvements through time and experience.

A tree will give from 15 to 20 lbs. of seed. The seed is collected in November and December (the early summer months here), and planted very thickly in boxes or beds about 12 feet in length and 3 feet in breadth and placed on a slight decline or fall and well irrigated. When the plants are about 6 inches in height and have a few leaves, from five to six (which is about five months), they are transplanted; holes of some 8 to 10 inches deep are dug about 6 feet apart, in which they are planted. The plant is covered partly over with twigs and other light stuff, grass and leaves, to keep off the sun for about three months. When the plant is strong and healthy, the undergrowth of other plants is cleaned out and great care is taken. This attention continues for about two years, and then the plants that are left are considered sound. About 25 per cent. of all the plants decay or rot in this time. Afterwards the undergrowth is cleared out once a year, and when the tree is six years old it is productive, grows to about 14 feet in height, and has a diameter of about 6 inches up to 6 or 7 feet. Where the bark is of the most productive kind, the trunk grows straight and slender, and has the form of an orange tree. When a tree is left standing for ten or twelve years, it is over a foot in diameter, the bark is thicker and heavier, but not so productive in quinia. The bark is ready to

* From the *Independent Journal*.

cut when the tree is about six years old. An incision is made around the trunk of the tree a few inches from the ground, another incision some 24 inches above around the tree, and then two incisions opposite, lengthwise. The bark is pulled off in two pieces. Two cuts, and sometimes three, are got off each tree, 22 to 24 inches in length, and 7 to 8 inches in width. When removed it curls up like the cinnamon bark. After the tree is stripped it is cut down, leaving a trunk about 12 inches above the ground, and from the base, where the bark has been left, there spring out some fifteen or twenty shoots or sprouts; these are left growing until they are a little higher than the stump, then they are thinned out, leaving two or three; they grow fast and in five years give good bark.

The trees produce on an average about 4½ pounds of bark, and are stripped in the southern hemisphere late in the spring—October to January. The bark is placed in paved yards, and is generally cured in four days, but if rain sets in, at times it takes nearly three weeks.

The principal enemy in the insect line is a large black ant, which is very destructive. There are various classes of the quina tree, calysaya, green and purple. The greater part of the quina passes through this city baled and sent to Tacne and Mollendo. Cinchona is the common name for all quina.

The market price is now 40 cents. per lb., Bolivian curreney. It has sold as high as 200 bolivianos per quintal. It formerly paid a tax of 6·40 bolivianos per quintal; now one-half, 3·20 bolivianos, one-half to the Government, and one-half municipal.

As the greater part of the quina forests were destroyed, and until very lately, the cultivation of quinia has not been carried out in a proper manner, it is only now that it may be said to be a regular business. The highest exportation of late years has been 20,000 quintals; but it has dwindled down for various causes, so that this year it will not be more than 5000 quintals, and at present prices leaves no profit, the expenses of getting it to the coast being heavy.

SUBSTANCES ACCOMPANYING BENZOIC ACID PREPARED FROM GUM BENZOIN.*

BY O. JACOBSEN.

On treating benzoic acid from gum benzoin with sodium carbonate solution, an oil is left undissolved, smelling of vanillin and also of phenol. By fractionation, it may be separated into three principal portions, boiling at 200 to 210°, 235 to 240° and 280 to 330°, and a pitch-like residue not further examined. The first fraction consists of methyl benzoate and guaiacol, which can be separated by treatment with cold dilute caustic soda. The second and smaller fraction, when shaken with water, gives up catechol in the aqueous solution; the portion insoluble in water and dilute alkalies is acetylguaiacol. The third and largest portion consists of an oil, insoluble in dilute alkalies, which by saponification with alcoholic potash, and subsequent treatment with water and ether, yields benzyl alcohol, and benzophenone, whilst the aqueous solution contains guaiacol and benzoic acid; this fraction therefore contains benzyl benzoate, benzophenone and benzoylguaiacol. The oil also contains vanillin, but in minute quantity only. The medicinal value of sublimed benzoic acid is attributed to the catechol and guaiacol; it is believed that of the above bodies only vanillin and benzyl benzoate exist ready formed in the gum. Benzaldehyde may be formed by the oxidation of the contained benzyl benzoate, so that the production of the former cannot be considered as a proof of adulteration with cinnamic acid. Schlickum and Schneider have tested the genuine nature of natural benzoic acid by its reducing boiling ammoniacal silver solution; but catechol will reduce the solution in the cold, and the author therefore suggests the following method of testing:—Convert the benzoic acid into the sodium salt, and, after drying, shake with ether; after removal of the ether, the residue may be dissolved in water, and the above or any other tests for catechol applied.

* From *Arch. Pharm.*, [3], xxii., 366–374. Reprinted from the *Journal of the Chemical Society*.

ESTIMATION OF MORPHINE IN OPIUM.*

BY V. PERGER.

The author has carefully examined the methods in ordinary use for the estimation of morphine in opium, as to their relative accuracy, making analyses of the same sample of opium by each method, and finds that they give most variable results. The methods in common use are Godeffroy's, Austrian Pharmacopœia, and Merck's.

Godeffroy's method is as follows:—Ten grams of dry opium powder are mixed with 25 c.c. of hot water, and then pressed between folds of linen, this operation being repeated until the water is no longer coloured. The liquid is then boiled two or three times with 8 to 10 grams of slaked lime and filtered; ammonium chloride is added to the filtrate until after standing it smells of ammonia. The morphine crystallizes out after twelve to twenty-four hours, and can be estimated by collecting it on a tared filter and washing it with dilute ammonia.

The Austrian Pharmacopœia method is as follows:—Ten grams of dry powdered opium are treated with 90 grams of a mixture consisting of 140 grams of distilled water and 40 grams of hydrochloric acid (12·2 per cent.) The residue remaining after filtering and washing is weighed. If the opium be good, it should not exceed 4·5 grams. The filtrate is mixed with 20 grams of powdered sodium chloride, and allowed to remain for twenty-four hours in the cold. The precipitate is then collected and washed with a saturated solution of sodic chloride. The filtrate is treated with ammonia and allowed to stand for twelve hours. The morphine which crystallizes out is separated by decantation, collected on a filter, and washed with as small a quantity of distilled water as possible; it is then dried in a porcelain basin, and treated with an equal weight of a mixture consisting of equal weights of acetic acid (20·4 per cent.) and water. After adding water, the liquid is filtered. The filtrate should not exceed 70 to 80 grams. An excess of ammonia is added to it, and it is allowed to remain for twelve hours, when the precipitate is collected and weighed. The weight should exceed 1 gram.

E. Merck's method is as follows:—Fifteen grams of opium are cut up and boiled with 100 grams of 45 per cent. alcohol. The extract is separated from the residue by filtration, and the latter is again treated with 100 grams of alcohol; 8 grams of crystallized soda are added to the solution, and it is evaporated without stirring. The residue is treated with 60 grams of cold water, and decanted into a glass cylinder; the clear liquid is poured off, and the undissolved portion washed again with 30 grams of cold water, and then with 45 grams of alcohol (90 per cent.), and finally collected. The crystalline mass remaining on the filter is dried between filter-paper, dissolved in 15 grams of acetic acid (1 part of acid sp. gr. 1·06 to 8 parts of water) and 15 grams of distilled water, and then filtered through the same paper on which the residue was collected. The filtrate is treated with ammonia, and the precipitate is collected and weighed after standing for twelve hours.

The author has devised the following method:—Ten to twenty grams of the opium to be examined are boiled for a short time with 15 to 30 grams of caustic baryta and about 150 to 200 c.c. water. The mixture is then filtered, and the residue repeatedly boiled with small quantities of water until the solution fails to give a reaction with molybdic acid and sulphuric acid. Excessive boiling is to be avoided, and as a rule the filtrate should not amount to more than 400 to 500 c.c. A stream of carbonic anhydride is passed into this solution, which contains all the morphine, until the liquid is supersatu-

* From *J. pr. Chem.*, [2], xxix., 97–110. Reprinted from the *Journal of the Chemical Society*.

rated, and then the whole is evaporated on a water-bath as quickly as possible. The residue is moistened with absolute alcohol, transferred to an Erlenmeyer's flask, and exhausted with successive quantities of boiling absolute alcohol until a sample evaporated on a watch-glass no longer gives a morphine reaction. This usually requires from 300 to 400 c.c. alcohol. The alcohol is removed by distillation, and the residue left in the flask is allowed to stand for some time with 15 c.c. of ammonia. It is next collected on a tared filter, dried at 40°, and treated repeatedly with chloroform. This is the crude morphine. It should be light-brown to straw-coloured. Crude morphine generally contains substances which can be classed under two heads, namely, (1) those which are insoluble in acetic acid; (2) those which are soluble, but which are reprecipitated by ammonia and potassium ferrocyanide. The author finds that the amount of the impurities is always small, and that the difference between the crude and the pure morphine is principally due to the loss of morphine in the process of purification. The following table gives the percentages of morphine found by employing the various methods. The impure products are marked thus*:—

Percentage of Morphine.

Opium.	E. Merk.	Aust. Pharm.	Godeffroy.	v. Perger.
I. . .	—	4·17*	1·63*	9·04
II. . .	5·99	2·04*	0·507*	8·37
III. . .	—	—	5·567	9·1
IV. . .	9·32	0·253*	8·52	11·0
V. . .	1·72	0·3*	1·17*	3·68
VI. . .	13·57	?*	8·42	14·75

PHARMACY ACT, 1868.

RECTIFICATION OF THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS.

We are requested by the Registrar to publish the following list of persons whose names will be erased from the Registers unless they communicate with him on or before 30th December next.

Those marked (*) are Pharmaceutical Chemists.

Abbot, Ann	St. Helens, Lancs.
Ackroyd, Thomas	Luddenden Foot, near Halifax, Yorks.
Adamson, William Francis	Market Place, Longridge, Staffs.
Agger, Joseph Edward	Watton, Norfolk.
Alexander, William	Edinburgh.
Allen, John	44, King Street West, Stockport.
*Anderson, Alexander	Hong Kong Dispensary, Hong Kong.
Anderson, Geo. Anthony Coulson	6, Lower Tulse Hill, Brixton, Surrey.
Ash, James Freer	7, Holloway Head, St. Thomas's, Birmingham.
Ashworth, Robert John	122, Bank Top, Blackburn, Lancs.
Atherton, William	225, West Derby Road, Liverpool.
Atkinson, William	10, Columberie, St. Helier's, Jersey.
Attenborough, Edmund	Misterton, Notts.
Ayres, John	3, Clifford Ssreet, Eccles New Road, Manchester.
Ayres, Richard	Cattle Market, Bridgwater, Somerset.
Bache, William	146, Mill Street, Liverpool.
Bailey, Edward Smith	Wellington, New Zealand.
Bailey, Isaac	37, St. Mary's Road, Hastings.
Bake, Mary	178, York Street, Hulme, Manchester.
Ball, Henry Simpson	St. John the Evangelist Road, Highgate, London, N.
Barber. Edward Anderson	68, Hercules Buildings, Kennington, London, S.E.
Barclay, John	196, High Street, Montrose, N.B.
Bardsley, Joshua	15, Warwick Street, Glasgow, N.B.
Barland, John Watling	24, West Lauriston Place, Edinburgh.
Barnes, Frederick	224, Roman Road, North Bow, London, E.
Bass, Charles William	81, Hatton Garden, London, E.C.
Bateman, Fredk. Augustus Newton	St. George's, Norwich.
Baumgarten, Adolph	520, Oxford Street, London, W.
Beal, Richard Reynolds	29, Southborough Road, South Hackney, London, E.
Beaumont, George Godfrey	1, Cheetham Street, Lord Street, Preston, Lancs.
Beaumont, Mary	7, Leading Post Street, Scarborough.
Beecham, John	Metheringham, Lincolnshire.
Beedle, Joseph	73, Hunslet Road, Hunslet, Leeds.
Bell, James Alexander	43, Shaw Street, Greenock, N.B.
Bell, William	4, Market Place, Carlisle.
Best, Charles	Woodlesford, Yorks.
Bibby, Henry	140, Market Street, Dalton-in-Furness.
*Blake, Charles	Sutton-in-Ashfield, Notts.
Blane. Gilbert	Mauritius.
Blanshard, Thomas	58, Hanover Street, Liverpool.
Blunt, George	34, King Street, Dudley, Worcestershire.
Bond, Charles	17, Blakebrook, Kidderminster.
Bond, John	Great Yarmouth.
Booth, Charles	
Booth, John Lee	Glossop, Derbyshire.
Borman, John Henrie	192, West Street, Dunstable Beds.
Boulton, Joe Seels	1, Edward Street, Meadow Street, Sheffield.
Bourne, Charles Matthew Kempsey	41, West Street, Boston, Lincs.
Bowen, Thomas Henry	178, Adrian Terrace, Finborough Road, West Brompton, London, S.W.
Bower, Charles	Low Moor, North Bierley, Yorks.
Bradbury, Charles	Lytham, Lancs.
Branson, Henry Albert	55, Old Town Street, Plymouth.
Breckon, Hugh Scott	15, Flowergate, Whitby.
Briggs, George Jeremiah	60, Market Place, Hull.
Bright, Thomas	11, Lisson Street, London, N.W,
Broadbent, George	Shepley, Yorks.
Bromfield, John	39, Orwell Street, Great Grimsby.
Brown, George	1, Upper High Street, Winchester.
Brown, James	Old Deer, Aberdeenshire.
Brown, John	Market Square, Hanley, Staffordshire.
Brown, Thomas Bellisson	124, Wheeler, Street, Birmingham.
Buck, Arthur	Chasetown, Staffordshire.
Burkinshaw, Charles	Stallingborough, Lincolnshire.
Butler, William	Sutton-in-Ashfield, Notts.
Cant, Richard	11, Sussex Street, Nottingham.
Capell, Henry	Floore, near Weedon, Northamptonshire.
Capell, Thomas	Floore, near Weedon, Northamptonshire.
Capstick, John William	Rydal Cottage, Rydal Road, Lancaster.
Caswell, Thomas George	1, Coleherne Terrace, West Brompton, London, S.W.
Chadwick, William	27, Methley Street, Kennington, London, S.E.
Challinor, Samuel McMillan	12, South Road, Waterloo, near Liverpool.
Champley, James	35, Westborough, Scarborough.
Charlesworth, Martha	30, Porter Street, Butler Street, Manchester.
Cheesman, Henry	40, Hampstead Road, London, N.W.
Chick, William	Thorn Street, Reading.
Chitty, Charles	Titchfield, Hants.
Chitty, Frederick	Titchfield, Hants.
Clark, Edward Hovell	Bury St. Edmunds.
Clarke, Charles	Welling, Kent.
Clifton, John Henry	Star Mills, Clementhorpe, York.
Cokayne James	Nottingham Road, Stapleford, Nottingham.
Coker, Owen Cole	15, Portland Square, Plymouth.
Coleman, Friend	High Street, Forest Hill, Kent.
Conway, John Jones	Church Street, Flint.
Cook, James	Berry Lane, Longridge, Lancs.
Cooper, Samuel Davies	Acton, Staffordshire.
Cornish, John	Ottery St. Mary, Devon.
Coster, Lawrence Henry	10, Shrewsbury Road, Paddington, London, W.
Critchley, John	College Villa, Longridge, near Preston, Lancs.
Crocker, Henry Radcliffe	Weston Road, Brighton.
Crookes, Joseph	65, Lord Street, Etruria, Staffs.
Crosley, Benjamin Wilson	Fenton Vue Woodhouse Lane, Leeds.
Cross, John	1A, Griffin Terrace, Fairmead Road, Holloway, London, N.
Cullen, Charles	Cheapside Market Place, Nottingham.
Curtis, Robert	133, Oxford Street, London, W.
Damant, Arthur Alfred	69, Wheeler Street, Birmingham.
Dangerfield, Edward	14, Upper Parliament Street, Liverpool.
Davies, Arthur	12, Richmond Road, Bayswater, London, W.
Davies, Frederick	28, Park Street, Bistol.
Davies, Thomas	229, Park Road, Liverpool.

Davies, Thomas	26, St. George's Place, Hyde Park Corner, London, S.W.
Davis, Oliver	97, High Street, Ventnor, Isle of Wight.
Day, Richard	Linskill Terrace, North Shields.
Day, William Westley	14, Upper Parliament Street, Liverpool.
Dell, William Mark	2, Maclise Road, West Kensington Park, London, W.
Dinnis, John	20, West Hill Road, Brighton.
Dison, Frederick	Twickenham Green, Middlesex.
Downward, Charles Herbert	Sun Street, Ulverston, Lancs.
*Dru, Casimir Theodore Aimé	Mauritius.
Duncan, John Lyons	127, Park Road, Toxteth Park, Liverpool.
Duncombe, William Pauncefort	7, Leading Post Street, Scarborough.
Dunmore, Edward	81, Malden Road, Kentish Town, London, N.W.
Dunning, Thomas	Newmarket, Suffolk.
Dunsford, W. Henry	18, Crescent, Jewin Street, London. E.C.
Dutton, George Frederick	225, Bristol Street, Birmingham.
Dyson, George William	57, North Street, Leeds.
Edge, Robert	314, Deansgate, Manchester.
Edwards, Charles Manning	129, Handcroft Road, Croydon.
Eedes, John Westmacot	Spring Villa, Church Road, Bexley Heath, Kent.
*Ekins, Charles	12, Leconfield Road, Highbury New Park. London, N.
Eldridge, James Henry	19, Market Place, Great Yarmouth.
Elliott, Joseph William	6, Lower Woodbine Street, South Shields.
*Ellis, Henry Brook	4, Trinity Terrace, East Finchley, London, N.
Ellis, James	Bracknell, Berks.
Ellis James	Percy Lodge, Waverley Road, Southsea, Hants.
England, William	Fern Villa, Ffynonau Terrace, Swansea.
Evans, John James	London.
Evans, Walter Sharp	141, Great College Street, Camden Town, London, N.W.
Evans, William Sharp	141, Great College Street, Camden Town, London, N.W.
Everitt, Arthur	10, Palace Plain, Norwich.
Faraker, John Joseph	Michael Street, Peel, Isle of Man.
Farrett, William Barrett	1, Pier Terrace, Lowestoft.
Field, Charles	Casualty Hospital, Chatham.
Finch, John	150, High Street, Cheltenham.
Findlay, James	24, Park Terrace, Regent's Park, London, N.W.
*Fisher, Henry Christopher	
Fisher, Isaac	Otley, near Leeds.
Fisher, Thomas	Otley, Yorks.
*Fisher, William Henry	15, Seething Lane, London, E.C.
Fleming, Edward Blake	20, Grove Road, Wanstead, Essex.
Foster, James	32, Furnace Hill, Sheffield.
Foster, William	Princes Risborough, Bucks.
Frampton, Nelson	Smethwick, Staffordshire.
Franciosi, Eugene Auguste de	10. Victoria Gardens, Notting Hill, London. W.
Fraser, Joseph	19, Abbey Road, St. John's Wood, London, N.W.
Frewen, Charles Andrew	183, Grange Road, Bermondsey, London, S.E.
Gardiner, Bruce Herbert John	2, Hoxton Square, London, N.
Garrad, William	Gravesend, Kent.
Garratt, John Colpman	9, Anglesea Terrace, St. Leonard's-on-Sea.
Garratt, Samuel	9, Anglesea Terrace, St. Leonard's-on-Sea.
Gee, Samuel	Blue Pits, Lancs.
Gibling, William	6, Alverton Terrace. Penzance.
Gilbert, Sydney	Market Place, High Street, Wincanton.
*Gill, Levi John	Claremont Cottage, George Place, Greenwich, Kent.
Girdler, George Toussaint	Morden Road, Merton, Surrey.
Goldsmith, Joseph Lawder	3, Bedford Place. Hamstead Road, Handsworth, Birmingham.
Goodacre, John William	80, Lumb Lane Bradford, Yorks.
Goodlad, James	53, Bunhill Row, London, E.C.
Goodrick, John	8, Ashley Terrace, Sussex Street, Winchester.
Gorton, John George, Jun.	480. Bethnal Green Road, London, E.
*Goulden, Edward Baker	45, Abbeygate Street, Bury St. Edmunds.
Grace, Charles	1, Russell Terrace, Portswood, Southampton.
Graves, John William	14, Edward Street, Deptford High Street, Kent.
Greaves, Edward Harrison	68, Lambeth Road, London, S.E.
Green, Edward	The Green, Stalham, Norwich.
Green, James	Bath.
Green, John Alired	282, Kennington Road, London, S.E.
Gregson, James Kenyon	1, Church Street, Blackburn.
Griffiths, Benjamin	6, Commercial Road, Newport, Mon.
Griffiths, Joseph	35, Waterhouse Street, Everton, Liverpool.
Griffiths, Thomas	2, Newport Road, Barnstaple, Devon.
Groom, Charles Frederic	27, Hawley Road, Kentish Town Road, London, N.W.
Ground, William Davie	Dispensary, Gainsborough.
Guest, Frederick William	43, Hunter Street, Brunswick Square, London, W.C.
Guest, George Frederick	1, Heath Villas, Chapel Road, Bexley Heath, Kent.
Haddock, Job	Newton-le-Willows, Lancs.
Hall, George	Felling, Durham.
Halstead, Harry	21, Back Lane, Blackburn, Lancs.
Hamilton, William Johnstone.	257, Saracen Street, Possil Park, Glasgow, N.B.
Hanbury, William	22, Copperas Hill, Liverpool.
Hancorn, John Thomas	Fore Street, St. Mary Church, Torquay.
Hannath, Thomas Woodmancy	Market Place, Great Grimsby.
Harrington, Thomas	Thornsett, near New Mills, Derbyshire.
Harrison, John	26, St. Leonard's Street, Bromley-by-Bow, London, E.
Hart, James	3, St. Mary's Road, Canonbury, London, N.
Hartle, Walter	Howard Street, Derby.
Harvey, Edward	Market Place, Wednesbury, Staffordshire.
Hassall, Elijah	123, High Street, Stalybridge, Cheshire.
*Haworth, Benjamin Henry	Yarburgh Street, Whalley Range, Manchester.
Hawthorne, Charles Oliver	16, Bloomfield Place, Smith Street, Hillhead, Glasgow.
Hay, Charles	23, Queen Square, Leeds.
Hay, Henry Scott	Athole Street, Dunkeld, Perthshire.
Heald, John Fenton	Mount Pleasant, Wakefield.
Heaps, James	3, Commercial Road, Halifax, Yorks.
Heely, Frederick	4, Chesterfield Street, King's Cross, London, W.C.
Henchley, Joseph Richard	89, New Church Road, Camberwell, London, S E.
Henderson, Walter	High Street, Sandbach, Cheshire.
Herbert, Samuel	13, King's Road, Clifton, Bristol.
*Hetherington, Martin Luther	Circular House, Commercial Road, Bournemouth.
Hill, Henry	138, Islington, Liverpool.
Hill, Walter	28, London Road, Lowestoft.
Hill, William	Downs, Hetton-le-Hole, Durham.
Hindhaugh, Richard	Ayres Terrace, North Shields.
Hislop, Thomas	Mauchline, Ayrshire.
Hobson, Frederick Eland	1, Hill Street, Richmond, Surrey.
Holdcroft, George	New Market Place, Beccles, Suffolk.
Holloway, Joseph	High Street, Tutbury, Staffs.
Holmes, John	42, Marsh Lane, Leeds,
Holmes, Samuel	63, Upperthorpe Road, Sheffield.
Hope. Joseph	Ashley, Staffordshire.
*Hopwood, Thomas Smith	8, Greenside, Richmond, Surrey.
Hornby, Charles Haycock	13, Lower Hillgate, Stockport.
Horsman, Arthur	149, Kennington Lane, London S E.
Howes, John Manning	45, High Street, Worcester.
Hubschmann, Emil	84, Leman Street, London, E.
*Hudson, John William	Holly House, Hampton Road, Birmingham.
Humfrey, Raphael Charles	20, Devereux Court, Temple, London, W.C.
Humphrey, Thomas Brigstocke	55, Fore Street, London, E.C.
*Hunter, John	5, Eaton Rise, Ealing, Middlesex.
Hutchinson, Joseph	Ivy Cottage, The Green, Matlock, Derbyshire.
Ing, Edwin Robert	Swindon, Wilts.
Inkley, Jesse	Fore Street, Shaldon, Teignmouth, Devon.
Jackson, David	Market Weighton, Yorks.
Jackson, John Lawson	18, Stockport Road, Manchester.
Jeeves, Edward	1, Marmion Place, Southsea.
Jeffs, Hubert	141, Drury Lane, London, W.C.
Jenkinson, John Henry Dixon	Gleadless, Sheffield.
Johnson, Frederick	22, Shakespeare Villas, Shakespeare Street, Nottingham.
Jolley, John	16, Hanover Square, Bradford, Yorks.

*Jones, Edward	81, Talbot Road, Bayswater, London, W.
Jones, George Heury	7, Market Square, Hanley.
Jones, John Walter	24, High Street, Blaenan Festiniog, Merionethshire.
Jones, Owen	Pen y Caira, Carnarvonshire.
Jones, Richard	Hadley, near Oakengates, Salop.
Jones, Robert	15, Derby Rd., Kirkdale, Liverpool.
Jones, Thomas	Aberavon, Glamorganshire.
Jones, William Forsyth	60, Hereford Road, Bayswater, London, W.
*Joule, John Samuel	High Street, Buxton, Derbyshire.
Keeling, John Clough	London.
Kemp, Edwin Richard	Fleet, Lincolnshire.
Kennedy, John Richard	50, St. Leonards Road, Poplar, London, E.
Kershaw, Joseph Henry	1, High Street West, Glossop.
King, William	Northumberland Court, Newcastle-on-Tyne.
Kirk, Robert	2, Brockelston Place. Nelson Street West, Greenock, N.B.
Knowles, Richard	Northcote Road, near Cemetery, Preston.
Lacy, Benjamin Walker	London.
*Lamusse, Louis A.	Mauritius.
Landeck, Samuel de Boyse	91, Vyse Street, Birmingham.
Langford, William Stockdale	Nayland, Colchester.
Large, Henry	Cliiton Square. Lytham, Lancs.
Lathbury. Robert	40, Castle Street, Liverpool.
Lavers, Henry Richard	14, Chatham Place, Paragon Road, Hackney, London, E.
*Lawrence, Henry	Godalming.
Lawson, Robert	
Lewis, William Dyer Hay	21, Paddington Street, London, W.
Lissaman, Thomas	Alton Hall, Allesley, Coventry.
Litchfield, William	50, High Street, Longton, Staffordshire.
Logan, Francis	High Street, Knighton.
Lowe, John	294, Old Kent Road, London, S.E.
Lowe. John Richard	294, Old Kent Road, London, S.E.
Lowth, William Spaven	Newport, near Brough, Yorks.
Luff, Henry Thomas	42, Chapel Street, Woolwich, Kent.
Lumsden, James	Thorndale, Peterhead, N.B.
Mabbott, William	19, Burbury Street, Birmingham.
McConachy, John	Hagley Street, Halesowen, Birmingham.
Macdonald, John	7, Roslin Street, Regent Road, Edinburgh.
Macewan, William Morrison	112, Gloucester Street, Kingston, Glasgow.
McGruer, John	115, Sister Street, Calton, Glasgow.
MacKay, Alexander Fraser	18, Whitehill Street, Dennistoun, Glasgow.
*Mackenzie, Henry	Edinburgh.
McLean, John	11, Clifton Road, Paddington, London, W.
Maconachie, James	188½, Cowcaddens Street, Glasgow.
Mann, Edwin	16, Croft Street, Lincoln.
Marjason, John Morris	Ashley Cottages, Denmark Street, Camberwell, London, S.E.
Mark, George	33, Penrose Street, Plymouth.
Marsh, William Munns	Sevenoaks, Kent.
Marshall, John	Monmouth.
Marston, George Henry	2, Swiss Terrace, Forest Hill, Kent.
Martin, Henry Ward	35, Raglan Road, Woodhouse, Leeds.
Masterman, Robert	Luddenden Foot, Yorks.
Masters, Henry Joseph	22, Ampthill Street, Bedford.
Maudson, Joseph Walker	Parkwood Springs, Sheffield.
Meager, Richard George	London.
Messer, Josiah	133, Oxford Street, London, W.
Miller, Septimus John	Crooks Moor Road, Sheffield.
Mills, William Peter	Macclesfield.
Molyneux, Henry	38, Canning Street, Hulme, Manchester.
Monkhouse, Edward Hewer	Great Sutton Street, Goswell Road, London, E.C.
Moore, Samuel	42, Queen Street, Earlestown, Lancs.
Moore, William	9, Park Cross Street, Park Lane, Leeds.
*Mordaunt, John	
Moreton, William	24, Union Street, Hyde, Cheshire.
Morgan, Albert Hall	High Street, Kinver, Staffs.
Morris, Alexander	121, Blackscroft, Dundee.
Morrison, William Norman	Inverness.
Nicholson, Edward	5, Bailgate. Lincoln.
Nicholson, Sarah	18, Acomb Street, Manchester.
Nicoll. Arthur	Moulsham, Chelmsford.
Nix, William	73, Buxton Road, Leytonstone Road. Stratford, Essex.
orri s, Elizabeth R.	Codnor, near Alfreton, Derbyshire.
Nugent, George Thomas	12, Edward Street, Brighton.
Nutt, George Henry	108, Albert Square, Manchester.
Ocock, Charles	High Street, Dulverton, Somerset.
*Oliver, William Hurdon	33, Park Hill Terrace, Liverpool.
Orchard, Isaac	Bell Avenue, Queen Square, Bristol.
Owen, Roger Jones	1, Market Terrace, Chatsworth Road, Clapton Park, London, E.
Owens, Robert	77, Great Dover Street, London, S.E.
Oxborrow, Edward	151, Nelson Street West, Birmingham.
Parkinson, Thomas	1, Church Street, Blackburn, Lancs.
Parks, John	Cannington, Somerset.
Pasco, John	189, Ordsall Lane, Manchester.
Pattison, Frederick	4, Clifton Square, Lytham, Lancs.
Payne, George	1, Bush Lane, London, E.C.
Pearson, Edward Smith	Liverpool.
Peat, Thomas Kirk	28, Great Russell Street, London, W.C.
Peberdy, Alfred William	83, Upper Conduit Street, Leicester.
Perkin, Joseph	Golden Hill, Kidsgrove, Staffs.
Phillips, George Walter	46, Holborn, London, W.C.
Phillips, John Dutton	Holly Hall, Dudley, Worcestershire.
Pickard, William	Cherry Row, New Town, Leeds.
Pickering, Bernard	23 Brompton Road, London, S.W.
Pickering, John	1a, Caygill Street, Salford, Manchester.
Pickstock, Thomas Wright	50, Manor Road, Walworth Road, London, S.E.
Pill, Edwin	15, Guildford Road, Brighton.
Pitman, Robert	5, Whittington Place, Upper Holloway, London, N.
Plumbe, Charles Marshall	30, Malvern Road, Dalston, London, E.
Plumm, Wilhelm	6, Langley Place, Commercial Road, London, E.
Plummer, William Thomas	Uttoxeter.
Plumridge, Charles	Denbigh Cottage, 23, Finchley Road, St. John's Wood, London, N.W.
Pool, George	Bond Street, Manchester.
Pope, Arthur N.	Woodbridge House, Shaftesbury, Dorset.
Porter, William Albert	3. Prebend Place, Bedford.
Potbury, Benjamin Charles	High Street, St. Mary Cray, Kent.
Pountney, William	Burton-on-Trent.
Powell, Henry	4, Blythe Terrace, Stanstead Road, Forest Hill, Kent.
Powell, Septimus	15, Princes Street, London. S.E.
Pratt, John	Bradford. Yorks.
Price, Rees	54, Lofthouse Road, Shepherd's Bush, London, W.
Priestley, Samuel	Tong Street, Dudley Hill, Bradford, Yorks.
Proctor, Joseph	274, Cable Street, Shadwell, London, E.
Prosser. Jehosophat	The Villa, Bronllys, near Talgarth, Brecknockshire.
Prout, Robert	Lamerton, Devon.
Pyle, Andrew	9, Rosemary Lane, Newcastle-on-Tyne.
Rae, Alexander Seaton	The Causeway, Barwell, Cambs.
*Rammell, Edward	6, Market Street, Crediton.
Ramsden, George	116, Waterloo Street, Burton-on Trent.
Rapier, Alexander	4, King Street, Kensington, London, W.
Rayner, Thomas	Hyde, Cheshire.
Reade, Wm. James	High Street, Wolverhampton.
Rees, David	Pontardawe, Glamorganshire.
Rees, John Arthur	129, Southwark Bridge Road, London, S.E.
Reynolds, John	Hunslet, near Leeds.
Rhodes, Samuel	196, Union Street, Rhodes Bank, Oldham, Lancs.
Riach, Charles Beverley	5, Albion Street, Belfast.
Richards, Robert	41, Paradise Street, Liverpool.
Richards, Samuel Ault	2, Temple Street, Wolverhampton.
*Rickards, Edwin	
Riley, John Peet	James Street, Kimberley, Notts.
Ritchie, Thomas	56, Ducie Street, Oxford Street, Manchester.
Roberts, Edmund	133, St. George's Road, Southwark, London, S.E.
Roberts, Joseph Elliott	St. James House, New Road, Ponder's End, London, N.
*Robertson, Frederick Freer Leslie	15, Ampton Street, Gray's Inn Road, London, W.C.
Robinson, John	63, High Street, Bridgnorth, Salop.
Robinson, Joseph	Bishop Auckland, Durham.
Rogers, Benjamin Whitworth	27, Bishopsgate Street Within, London, E.C.

Rogers, Samuel	6, County Place, Totterdown, Bristol.
Rogers, William Sexton	High Street, Newport, Isle of Wight.
Roper, Charles Robert	344, Marc Street, Hackney, London, E.
Rowden, James	High Street, Calne, Wilts.
Rowell, Joseph	Longthorpe, near Peterborough.
Roy, Joseph Cree	792, Gallowgate Street, Glasgow.
Rushworth, Jonas	Bare, near Lancaster.
Russell, Matthew Rawlings	Station View, Fairfield, Droylesden, Lancs.
Ruston, Joseph	25, Market Street, Chorley, Lancs.
Rutherford, Edward	101, Greenough Street, Wigan.
Sadler, Thomas	11, Tredegar Place, Bow, London, E.
*Sanders, Albert John	Convict Prison, Gibraltar.
Sansom, Samuel	197, Parrock Street, Gravesend.
Sargeant, Samuel	4, Dartmouth Crescent, Dartmouth Park Hill, Upper Holloway, London, N.
*Savage, John Welch	9, Bank Street, Newton Abbot, Devon.
Sawkins, Susan	Stansted, Essex.
Scarrow, William	Sunderland.
Schiemann, Ernest	72, Winstanley Road, Clapham Junction, London, S.W.
Scholes, Frederick Darfield	129, Oldfield Road, Salford, Manchester.
Scott, Hubert Payne	St. Peter Street, Tiverton, Devon.
Scott, Mary Emma	St. Peter Street, Tiverton. Devon.
Scott, Walter	137, Fitzwilliam Street, Sheffield.
Serjeant, Robert	11, Mount Pleasant Terrace, Plymouth.
Shepherd, Thomas	Heighington, Durham.
Shepley, Samuel	Spital, near Chesterfield.
Shuttleworth, Thomas	41, Union Buildings, Blackburn, Lancs.
Sims, George Samuel	149, Lower Kennington Lane, London, S.E.
Skirving, George	47, Lower High Street, Wednesbury.
Slade, Edwin	Chatteris, Isle of Ely, Cambs.
Slater, Elias	3, Clarence Street, Prince Street, Manchester.
Smale, Charles	82, Barkham Terrace, Lambeth Road. London, S.E.
Smith, Joseph	46, Broad Street, Ross, Herefordshire.
Smith, Joseph Wheeler	307, Oxford Street, Manchester.
Smith, Robert	38. Thornton Street, Southwark, London, S.E.
Smith, Robert John	Horselydown, London, S.E.
Solomon, Charles Edwin	63, Shaw Street, Liverpool.
*Sparks, John	37, Arundel Square, London, N.
Spear, George	150, Queen Street. Portsea, Hants.
Spensley, Thomas Brentnall	9, Joy Street, Barnstaple, Devon.
Spiers, William	5, Wycombe Terrace, Hornsey Road, London, N.
Stainer, Robert William	84, St. James's Road, Southsea, Hants.
Stead, Samuel	219, Meanwood Road. Leeds.
Stebbing, Harry	Stubbin, Elsecar, Yorks.
Stedman, James	Lower Tooting.
Stevenson, Frederick	4, Burton Road, Derby.
Stevenson, Henry Ernest	20, Ridgway Place, Wimbledon, Surrey.
Steward, Theophilus	Trimpley House, 18, St. Mary's Road, Leamington.
Steward, William	Reform Square, Campbeltown, N.B.
Stone, John James	High Street, Alton. Hants.
Stratford, Alfred Joseph	Stonebroom, near Alfreton, Derbyshire.
Sweetman, John Merson	49, Standishgate, Wigan.
Symonds, Henry	Banham, near Attleborough, Norfolk.
Tamlyn, Robert	Dunstall, Wolverhampton.
Tartt, Edward Henry	45, Lundie Street, Liverpool.
Tate, Christopher	6, Winchester Street, South Shields,
Taylor, George William	Stallingborough, Ulceby, Lincolnshire.
Taylor, James Johnson	157, Friargate, Preston, Lancs.
Tecar, Thomas Hives	117, Belgrave Gate, Leicester.
Thistleton, Hugh	Belle Vue Terrace, Upper Clapton, London, E.
Thomas, Frederick William	101, Mortimer Street, London, W.
Thomas, John	19, Lower Oxford Street, Swansea.
Thomas, John Griffith	110, Cheltenham Road, Bristol.
Thompson, Henry	105, Hither Green Lane, Lewisham, Kent.
*Thompson, John Robert	The Villa, Riccall, near York.
*Thompson, John Tatham	St. Marys, York.
Thursby, John	Easington Lane, Durham.
Tice, Richard	St. Peter's, Norwich.
Tiernan, Robert	59, St. Domingo Grove, Everton, Liverpool.
Towler, George Bland	58, Queen's Road, Everton, Liverpool.
Trood, Richard	81, Malden Road, London, N.W.
Troughton, James	24, Chatsworth Street, Liverpool.
Tucker, Robert Lewis	9, North Street, Bristol.
Tullidge, Robert	Roath, Cardiff.
Turner, James	7, Dryden Road, Edge Lane, Liverpool.
Turner, William Henry	31, St. John's Street, Oxford.
*Twemlow, Francis Ernest	57, Castle Street, Oxford Street, London, W.
Tyler, George	12, Edward Street, Brighton.
Urwin, John	Gateshead-on-Tyne.
Verity, Richard	35, Warwick Street, Regent Street, London, W.
Vincent, Henry Moore	1, Russell Gardens, Kensington, London, W.
Wagstaff, John	12, Church Row, Marlborough Road, Dalston, London, E.
Wagstaffe, Katherine H	89, New Church Road, Camberwell, London, S.E.
Wakefield, Henry	3, Hedgerley Park Terrace, Turnham Green, Middlesex.
Wakefield, John	3, Hedgerley Park Terrace, Turnham Green, Middlesex.
Walker, Alexander	1, North Fort Street, Leith.
Walker, Ralph Dearlove	41, Chancery Lane, Manchester.
Walkinton, William Marmaduke	7, High Street, Tenby, Pembrokeshire.
Wallace, Andrew	71, Montgomery Street, Edinburgh.
Wallace, James	Market Street, Dalton-in-Furness, Lancs.
Wallis, James	Market Place, Hornsea, near Hull.
Ward, John James	7, Norfolk Place, Norfolk Street, Hull.
Watson, Edward Arthur	2, Usk Terrace, Whitby.
Watt, John	Linnwood, near Paisley, N.B.
*Watts, John	57, Baker Street, London, W.
Weaver, Frederick	Wolverhampton.
Welchman, Edward Elers	24, Gold Street, Northampton.
Wells, Albert Charles	3, Wood Hill, Northampton.
Weston, Samuel Cranness	New Buckenham, Norfolk.
Wheather, John	21, Dock Street, Leeds.
*Wheeler, Albert	2, Stanshaw Terrace, Commercial Road, Landport, Hants.
Whitaker, Benjamin	Batley, Yorks.
White, William	25, Lyndoch Street, Greenock, N.B.
Whitehead, John	Yorkshire Street, Rochdale, Lancs
Whitmore, Charles	61, Conduit Street, Leicester.
Wilkins, George Montague	11, Wellington Place, Hastings.
Wilkinson, Henry	74, Bark Street, Bolton.
Williams, Charles Adrian	8, Phœnix St., Stonehouse, Devon.
Williams, John	Llanenddog, Anglesey.
Williams, John Havard	15, Lower Tulse Hill, Brixton, London, S.W.
Williams, Richard Jones	7, Church Street, Liverpool.
Williams, Thomas Nash	91, Cardiff Road, Aberaman, Glamorganshire.
Williams, William	Aberdare, Glamorganshire.
Williamson, William	306, Kennington Park Road, London, S.E.
*Wills, Joseph	19, Park Terrace, Regent's Park, London, N.W.
*Wills, Thomas Doidge	Barnstaple.
Willson, Alfred	The Hospital, St. Albans.
Wilson, Alexander Robb	32, Dee Street, Poplar, London, E.
Wilson, Richard	6, Villiers Street, Bradford, Yorks.
Wilson, William	55, Albert Road, Morice Town, Devonport.
Windmill, William Henry	9, Church Road, Barking. Essex.
Winstanley, Alfred	238, Featherstall Road, Oldham.
Witchellow, William	35, East Street, Walworth, London, S.E.
Wolfenden, Thomas	75, Oxford Street, Manchester.
Wonfor, Herbert Ison	Amport, Andover, Hants.
Wood, Albert	Castle Street, Dudley.
Woodhead, Joseph Thornton	60, Spencer Street, Everton, Liverpool.
Woollatt, Albert Newland	Arlesey Siding, Beds.
*Worthington, William	45, Kensington Road, Southport.
Wragg, Francis Rook	71, Embden Street, Manchester.
Wragg, James	Crookes, Yorks.
Wright, John Armstrong	Deardengate, Haslingden, Lancs.
Wright, Joseph	2, Oxenden Street, Coventry Street London, S.W.
Yates, George	14, Beloe Street, Toxteth Park, Liverpool.
Young, Dixon	20, Grange Terrace, Norton, Stockton-on-Tees.
Young, William Williams	225, Jamaica Road, Bermondsey, London, S.E.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 15, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE OPENING OF THE SOCIETY'S NEW HOUSE IN EDINBURGH.

ON Thursday last the premises recently acquired by the Council of the Pharmaceutical Society of Great Britain, in York Place, Edinburgh, with a view of affording greater convenience in carrying on the work of the Society, as well as furnishing a central rallying place for pharmacists in Scotland, were officially opened. In the evening a Conversazione was held, and the company received by the President of the Society (Mr. M. CARTEIGHE), the Vice-President (Mr. S. R. ATKINS), the Treasurer (Mr. J. ROBBINS) and other members of the Council who were present, included not only a considerable number of the most distinguished pharmacists in the country, but also several eminent members of the medical and other learned professions. Indeed, so far as may be judged by the amount of cordial sympathy shown towards the Society at this juncture, it enters its new home in Scotland under the happiest auspices and with a prospect that the expense incurred in taking this step will bring an ample return in the increased respect and consideration which it will secure for the followers of the practice of pharmacy in that country. On the preceding evening a number of Scottish pharmacists had dined together at the Royal Hotel, to celebrate the opening of the new house, and had extended their hospitality to a number of representative gentlemen connected with the institutions of the city of Edinburgh, as well as to friends of the Pharmaceutical Society who had travelled from the South to be present at the opening ceremony. A perusal of the proceedings and of the friendly sentiments expressed by the numerous eminent guests, which will be found reported at length in another part of this Journal, will perhaps give the best idea of the importance attached to the event not only by pharmacists, but by the university, medical and municipal authorities of the city of Edinburgh.

The principal object of the Council of the Pharmaceutical Society in purchasing and fitting up the premises in York Place, has been, no doubt, as stated by the President, to place at the disposal of the members north of the Tweed a house suitable for the proper conducting of the pharmaceutical examinations in Edinburgh, and which might also be utilized for the promotion of pharmaceutical education. How well this object has been accomplished, and how thoroughly the Committee entrusted with the superintendence of the necessary alterations has performed its duty, becomes evident to any visitor immediately upon crossing the threshold. The house seen from the outside is a substantial looking stone edifice, but the interior more than satisfies any expectations raised by the exterior. The portion in which the principal operations of the Society will be carried on consists of four spacious and lofty rooms, two on the the ground floor and two on the floor above. Those on ground floor are devoted principally to educational purposes, the front room (26ft. by 18ft.) being fitted up as the Museum, whilst the back one (19ft. by 14½ ft.) is intended for the Library. It may be remarked in passing that both these departments are fairly well furnished, and even in their present condition offer most valuable facilities for study, whilst there can be little doubt that now there is more available room the number of both specimens and books will soon be augmented. Passing up a wide staircase the visitor reaches the apartments in which the Board of Examiners for Scotland will henceforth meet. The front room on this floor (26ft. by 18ft.) contains the laboratory fittings requisite for the examination in chemistry as well as a dispensing counter for that portion of the examination. The examination in the other subjects will be conducted in the room behind (30½ft. by 19ft.). This latter fine apartment will also be used for evening and other meetings. The rooms appear to be well ventilated, principally by means of Tobin shafts, and altogether the general arrangements, as well as the decorations, reflect considerable credit upon the architect, Mr. BLANC.

In view of this provision by the Pharmaceutical Society of a handsome and convenient home for pharmacy north of the Tweed, it is not unreasonable to hope that some of the Scottish pharmacists who have hitherto stood aloof may be moved now to join its ranks, and use their best energies in increasing the influence of an organization which during the last forty years has done so much to advance the position of pharmacy in the two kingdoms. As remarked by Professor REDWOOD, during nearly a score of years hard work was being done by English members of the Pharmaceutical Society of Great Britain before the Scottish pharmacists looked upon it with much favour, and even since then, although, we believe, Edinburgh is now pretty well represented in the Society, the pharmacists in many other districts in Scotland have shown but little disposition to work in concert for the common good. It may be that the explanation of this is to be found in part in the distance of the headquarters in London, and the hitherto limited nature of the branch establishment in Edinburgh. But the opening of the premises in York Place has

quite altered this aspect of affairs, and it now lies with Scottish pharmacists to justify, by their active participation in the Society, the enterprise of the Council which has placed such a valuable boon within their reach.

RECTIFICATION OF THE REGISTER.

In another part of the Journal will be found a list of persons whose names are now liable to be erased from the Register of Chemists and Druggists, the liability in each case being consequent upon failure to answer either of two registered letters posted at an interval of three months to the address recorded against the particular name in the official register. Formal notice is therefore now given by the Registrar that he will proceed under the powers conferred upon him by the tenth section of the Pharmacy Act, 1868, to erase all the names contained in the list published to-day, concerning which satisfactory information is not received by him before the 30th day of December.

Upon Mr. Warton being called upon, on Tuesday evening last, by the Speaker, to proceed with his motion in the House of Commons respecting poisonous patent medicines, he postponed doing so until Tuesday, the 9th of December.

* * *

The contradictory pleas of "justification" and "not guilty" sometimes put forward by lawyers in answering one and the same charge doubtless find a warranty in occasional success due to the influence of legal technicalities. Such an inconsistency is, however, hardly expected to be met with in a "plain statement," yet something very like one occurs in two succeeding paragraphs of a passage on the relations of the medical profession to chemists and druggists in an address recently delivered by Dr. Sheen, before the South Wales and Monmouthshire Branch of the British Medical Association. Dr. Sheen, in stating the reasons in favour of a medical man dispensing his own medicines, expresses his opinion that mistakes are in such case not so likely to occur, and that the medical man, by making up his own medicines, or by employing an assistant to do so under his direction, ensures a security against error which does not exist when he "gives a prescription to be made up at any chemist's." Having arrived at this conclusion, which, if correct, would seem to point to an imperative duty, Dr. Sheen, a few lines further on, contemplating the subject "apart from the mere ethical question" and in the light of the fact that dispensing is to the hard-worked practitioner "a great drudgery and a burthen not serenely put up with," says, "The only remedy, under the present state of the law seems to me to be to arrange with some chemist to do one's dispensing and pay him for the same." According to which the dispensing by the chemist which is dangerous when done directly for the public becomes tolerable when the medical practitioner has a pecuniary interest in it.

* * *

The report on another page of the inquest held at Kingsbridge, apart from the sad accident which was the occasion of it, points to serious danger in respect to a breach of the law which may be incurred, especially at this time of the year, quite inadvertently. It cannot be too distinctly borne in mind that "coloured fires" are in the eye of the law "explosives," and that the making, storing and selling of these compounds is in the main subject to the same restrictions as regulate the dealing in gunpowder. According to the Explosives Act, 1875, and the Explosive Substances Act, 1883, the making or keeping of them in an unlicensed place is clearly illegal, and involves liability to heavy penalties. Attention has been drawn to the subject in these columns on several occasions, and more than one prosecution for breach of the law has been reported; nevertheless, it is probable that there are chemists and druggists who are still unaware of the stringent nature of the law in respect to "coloured fires." It is strongly recommended that persons contemplating preparing or selling such articles should first make themselves acquainted with the provisions of the Explosives Act, 1875, a copy of which may be obtained from the Queen's printers, at the price of a few pence.

* * *

A well-attended general meeting of chemists and druggists was held in Dublin on the 7th instant, for the purpose of making final arrangements for the formation of a club in connection with the trade in that city. The chair was taken by Mr. Henry Forewell, and it was resolved that the club should be formed "for the purpose of establishing a reading-room, library, billiard-room, lectures, classes, debates, etc." The first President is to be Professor Tichborne; Messrs. H. Forewell, J. A. Gardiner and W. Hayes have been chosen Vice-Presidents; Mr. E. M'C. S. Hill, Honorary Secretary, and Mr. A. M. Millen, Honorary Treasurer.

* * *

A recent prosecution of a pharmacist in the *tribunal correctionel* of Grenoble presents a curious point in French law. It appears from the terms of the judgment that a woman having taken a child in the last stage of phthisis to a pharmacist he, at her request, gave her a consultation, and prescribed medicine for the disease, giving amongst other things some syrup of balsam of tolu to which arseniate of soda had been added. After taking the syrup the child showed symptoms of arsenical poisoning, which were relieved by moist ferric hydrate administered by a medical man, but the child died three days afterwards. A *post-mortem* examination showed that tuberculosis had been the cause of death, but revealed inflammatory spots and lesions attributed to the action of the poison, an opinion which was supported by the discovery of arsenic in the liver and stomach. The pharmacist was therefore held to have been guilty of two offences: first, in illegally practising medicine; and secondly, that whilst thus breaking the law he had incurred the responsibility of inflicting "involuntary blows and wounds."

* * *

Some months since we quoted from the *Ceylon Observer* an estimate that the export of cinchona bark from Ceylon would during the next few years amount to 8,000,000 to 10,000,000 lbs. annually. This estimate was in some quarters looked upon as an exaggeration, but the latest returns show that in the twelve months ending the 30th of September last that quantity was exceeded, and reached the enormous total of 11,491,947 lbs., the shipments during the last month of the season having exceeeded one million pounds. It is probable, however, that this large output is the result of financial pressure which has existed in the island of Ceylon, and that it

does not represent a normal harvest of bark. Our Ceylon contemporary expresses an opinion that any bark sold at under sixpence per lb. in the London market would fail to remunerate the producer; but adds that it will not be the average of cinchona trees planted, nor the age and quality of the bark available, nor even the demand and price in the home market, so much as the financial condition of the planter, which will in Ceylon, for some years, have chiefly to be considered in making up estimates. Of the 11,491,947 lbs. exported, 9,130,826 lbs. were sent to this country, 435,541 lbs. to Marseilles, 969,082 lbs. to Genoa, 863,529 lbs. to Venice, 6946 to America, and the remainder to other countries.

* * *

The *Lancet* quotes from an Italian journal a statement that two waggons laden with chloride of lime and carbolic acid, on their way from Switzerland to Italy, were stopped at Chiasso, a station of the sanitary cordon, the officials refusing to make any exception in carrying out the peremptory orders that had been issued that all imports should be disinfected. It is not stated whether either or both of the consignments were utilized, or whether a local store of disinfectant was drawn upon in this *reductio ad absurdum* of the quarantine regulations.

* * *

Seven series of "Cantor Lectures" in connection with the Society of Arts are announced for delivery during the forthcoming session, the first of which will commence on Monday, December 1. They are to be on "The Use of Coal Gas," by Mr. H. B. Dixon; "Climate and its Relation to Health," by Dr. G. V. Poore; "The Distribution of Electricity," by Professor Forbes; "Artists' Colours," by Mr. J. M. Thompson; "Carving and Furniture," by Mr. J. H. Pollen; "Photography and the Spectroscope," by Captain Abney; and "The Manufacture of Toilet Soaps," by Dr. C. R. Alder Wright. There is also to be a special course of six lectures under the Howard trust on the "Conversion of Heat into Useful Work," by Mr. W. Anderson, commencing on Thursday, the 27th inst.

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A meeting of the Chemical Society will be held on Thursday, November 20, at 8 p.m., when there will be a ballot for the election of Fellows, and the following papers will be read:—"On some New Paraffins," by Khan Bahadur Dr. Bomanji Sorabji; "On Additive and Condensation Compounds of Di-Ketones with Ketones," by Dr. F. R. Japp and Dr. N. H. Miller; "On a New Method of determing the Vapour Pressures of Solids and Liquids," by Dr. W. Ramsay and Sydney Young; "On the Action of the Halogens on the Salts of Trimethylsulphine," by Dr. L. Dobbin and Dr. Orme Masson; "Sulphates of Potassium and Lithium," by S. U. Pickering; "Application of Iron Sulphate in Agriculture," by Dr. A. B. Griffiths.

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The annual meeting of the Manchester Pharmaceutical Association will be held at the Memorial Hall, on Friday evening next, at 7.30, when the annual report will be presented and officers elected for the ensuing session.

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The next meeting of the Manchester Pharmacy Students' Association will be held at the Owens College, on Thursday evening, the 20th inst., at 8 o'clock, when a report on Materia Medica will be made by Mr. W. Elborne.

Dinner of Scottish Pharmacists

IN CONNECTION WITH THE

OPENING OF THE NEW PREMISES OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN IN EDINBURGH.

On the evening of Wednesday last, a dinner of Scottish Pharmacists, under the auspices of the North British Branch of the Pharmaceutical Society of Great Britain, on the occasion of the opening of the Society's new house in York Place Edinburgh, was held in the large saloon of the Royal Hotel. There were nearly a hundred gentlemen present. Mr. John Nesbit occupied the chair, and Mr. H. Bellyse Baildon and Mr. John Borland were croupiers. On the right of the Chairman were—the Lord Provost; Mr. Atkins, Vice-President of the Pharmaceutical Society; the Rev. Dr. Walter C. Smith, Professor T. R. Fraser, Mr. Williams, Professor Grainger Stewart, and Dr. Littlejohn; and on the left were Mr. Carteighe, President of the Pharmaceutical Society; Professor Crum Brown; Dr. Smith, President of the Royal College of Surgeons; Professor Redwood; Dr. Peel Ritchie, Treasurer of the Royal College of Physicians; and Dr. Napier, Glasgow. Amongst others present were—Messrs. Bottle, Butt, Robbins, Hills and Richardson, members of Council; Mr. Richard Bremridge, Secretary to the Society; Dr. Paul Mr. Passmore; Professor Archer, Edinburgh Museum of Science and Art; Mr. Hippolyte J. Blanc, F.S.A. Scot., architect of the new premises in York Place; Dr. Argyll Robertson, Dr. Angus Macdonald, Dr. A. P. Aitken, Dick's College, Edinburgh; Dr. Hare, Senior President, Royal Medical Society, Edinburgh; Dr. J. Dunsmure, Mr. J. F. Mackay, W.S.; Mr. P. Geddes, F.R.S.E., etc. Apologies were received from the following:—Sir Alexander Grant, Edinburgh; Professor Dickson, Edinburgh; Professor Bayley Balfour, Oxford; Professors McKendrick and Gairdner, Glasgow University; Professor Dittmar, Anderson's College, Glasgow; Professor Attfield and Professor Bentley, School of Pharmacy; Professor Matthew Hay, Aberdeen; Professors Douglas, MacLagan and Chinic, Edinburgh; Dr. G. W. Balfour, P.R.C.P.E.; Dr. Fergus, Pus. F.P.E.S.G.; Principal Cairns, Dr. Cameron Lees, Dr. Heron Watson, Councillor Dr. Russell, Dr. Greenhow, Reigate; Dr. Cathcart; Messrs. Churchill, Hampson, Greenish, Gostling, Andrews, Savage, Schacht, Radley, Squire and Woolley, members of the Council of the Society; Mr. T. Hyde Hills and Mr. G. W. Sandford, past Presidents of the Society; Mr. Elias Bremridge, late Secretary to the Society, Mr. E. M. Holmes, curator to the Society; Messrs. J. P. Kay, Aberdeen; Freeland, Bathgate; Napier, Edinburgh; Rannis, Leith; Brodie, Glasgow; Kemp, Portobello, and Rannis, jun., Leith; and E. C. C. Stanford.

After an excellent dinner,

The CHAIRMAN said that the first toast he had to propose was that of "Her Majesty the Queen." The Queen had long reigned not only in accordance with the lines of the constitution, but she had reigned in the hearts of her subjects, and he was sure he expressed the feeling, not only of that company, but of the whole of her subjects, when he said they all wished that she might long reign, and that her reign might be the longest on record. She had gained the affection of her subjects by the kindly sympathy which she extended to them in the calamities that daily befell them—sympathy which was extended to the dweller in the cottage equally with the dweller in the hall.

The toast having been duly honoured,

The CHAIRMAN next proposed "The Lord Provost, Magistrates and Town Council." He said that the Town Council, in representing the citizens of Edinburgh, had always taken a prominent place in promoting the moral and social welfare of the people. Centuries ago

when education was not for the many but for the privileged few, Edinburgh founded a university for herself which had gone on extending in usefulness till they had seen the tercentenary of its existence; and he was sure that the citizens of Edinburgh must feel proud of their offspring. Of her schools and educational institutions he would like to speak; but he knew more of her sanitary arrangements. In that respect he was sure she would set a very bright example to other cities. For some years she had had an Act for the registration of disease—an Act which had been the means of saving many lives and preventing much sorrow and suffering. That was an example worthy of being followed, and he hoped they would soon see the Act extended over the whole country. He might call attention to the many public parks and gardens connected with the city; but the Town Council was not satisfied with these, and was providing for the probable increase of population by acquiring ground, for which not only the present but the future inhabitants of the city would thank the Lord Provost, bailies and councillors for having had the foresight to acquire.

The Lord Provost, in returning thanks, said he was very proud, occupying, as he did, the position of chief magistrate, to have the honour of returning thanks to the assemblage for the kind manner in which they had received the toast. If there was one thing more than another of which they were proud it was their historical connection with the education of Scotland. The University was flourishing in an unprecedented degree, and at present they were proud to know that they had in this city one of the greatest medical schools in the world. They were, therefore, delighted at all times to welcome among them those who were connected with medical science; and it would ill become them not to keep the city sweet, and clean, and healthy. To know that it was at present perhaps the healthiest large city in the world was to them a much greater pleasure than if it were ten times or twenty times as rich. It must be a very humiliating position for any chief magistrate to occupy, who was in the midst of great wealth and extreme poverty, and who knew that there were thousands dying around him yearly from misery which he could scarcely help feeling might and ought to be prevented. He believed that the citizens and corporation of Edinburgh did all they could for the preservation of health and life, and that under the auspices of their medical officer of health, their esteemed friend, Dr. Littlejohn, a great deal was being done with that view, and with very good results. They did not by any means pretend that they did all that they could or ought to do; but so far as their knowledge and their means went they were always aiming to do better in the future than in the past. They could not boast of grand municipal buildings; they could not invest millions in these and leave their city unwholesome. The chief magistrate and Town Council of Edinburgh were much more proud of the fact that their city was a healthy city than to show anything magnificent in their municipal buildings. They were proud of the grand city and its historical character, because it was the heart of Scotland and the heart of its history. They were still more pleased when friends from a distance came to see them, and they were all anxious that their friends should come back again and see them. He had much pleasure, on behalf of the Council, in returning thanks for the toast.

Mr. J. R. Young said that he had been asked to propose the toast of "The Edinburgh University." In ordinary circumstances he should have felt it incumbent upon him to make every preparation before speaking to a toast of this kind; but when he remembered the great tercentenary gathering that took place in the early spring, and the numerous meetings which it called forth, he felt that it would be very unwise in him to say anything now, especially considering the many effusions which those meetings called forth, the echoes of which were still ringing in their ears. The meetings in commemoration of the three-hundredth year of the existence of the University were, as they all knew, attended by eminent men of all countries and all climes, and all conditions and ranks of society, and speaking a great variety of languages. They also knew that at those meetings testimony was given, and that in no stinted measure, to the excellence of the University as a seat of learning; not only on account of the high position of those who had filled its chairs, not only on account of their valuable prelections and brilliant discoveries, but also because of the many men who had issued from its walls, and, settling in other places, had added to the lustre of the University. There was no period in the existence of the University in which it had been more fit to carry forward the work that a University ought to do; at no time had those engaged in teaching been more exact as to the carrying on of the education of young men, or in addition to their ordinary lectures had better promoted that scientific investigation on which all true investigation should be based, and in regard to which it would be difficult to predict what might not be done by gentlemen carrying on work of that particular character. He believed that at no time during the existence of the University had the classes been more numerous than now, or better attended by a class of gentlemen whose intellectual attainments were such that great work might be anticipated from them. At no time during the history of the University had student life realized a more distinctive position than now. It was realized not only by the work accomplished, but by the community at large. He had lately had the pleasure of attending a lecture by the Dean of one of the Faculties, and he was pleased to hear him say that there were rooms in preparation within those princely buildings where students might be accommodated, where they might meet and have intercourse with each other and form friendships which might in after life tend to their edification. There was an idea promulgated in that lecture, and it was a good one, namely, that there might be erected in connection with the University a large building in which students from a distance and especially from the colonies might be accommodated. He thought if that proposal was carried out in a proper manner and under proper superintendence it would tend greatly to relieve the minds of parents and guardians. He did not need to say any more in connection with the toast, as almost everything had been said at the commemorative meetings to which he had referred. He would, however, take the opportunity of connecting with the toast the name of Professor Crum Brown. That was a name which was very dear to Scotland and the family with which Professor Crum Brown was connected was one peculiarly dear to Scotland. Professor Crum Brown in early life attained to great distinction by some of his investigations, and they knew how much he was the idol of the students in his department. When they remembered that he filled the chair of Black, Hope and Gregory, and that he worthily filled that chair, he was sure they would have no hesitation in responding to the toast with much enthusiasm.

Professor Crum Brown returned thanks. He said that the chair which he occupied was one which was in a very special manner connected with the profession whose guests they were that evening. There were two great roots of the science of chemistry in history—the one was pharmacy, and the other metallurgy, and these, so different in their origin, had united together and produced chemistry as a science. During that delirious period, as it might be called, or dreamy period of the middle ages, when the fancy of enthusiasm took possession of science, the elixir of life and the philosopher's stone were representatives of the pharmacy and the metallurgy of that time. That might be some reason why the professor of chemistry might be called upon to speak at a meeting of pharmacists. The University of Edinburgh had been closely connected with the citizens of Edin

burgh. As they had heard that evening regarding the origin of the University, it was the city's college and they were very proud of that historical relation to the city. They were sprung from the people and it was their privilege and their pride to minister to the people. A very important part of the people of Edinburgh had always been the pharmacists, because that profession had occupied in Edinburgh a position of honour and of learning, which had not always been the same in every other part of the country. There had always been in Edinburgh learned pharmacists as well as mere commercial pharmacists. It had been the case that true scientific knowledge and learning had always existed amongst that body. He thought that was a sufficient bond to connect the University with them. But there were other points to which he might refer. The medical faculty of Edinburgh was, to a very large extent, the origination of the University, and the origination of it was to a very large extent due to the science or art of pharmacy. The first Munro, who was really the founder of the medical faculty in Edinburgh, was an anatomist, but no faculty could have existed if there had not been in addition a band of men who were chemists and pharmacists. That was the origin of the medical faculty in Edinburgh, and that showed that there was an intimate connection between the medical and chemical departments of the University and the pharmacists of Edinburgh. Sir Robert Christison's name would always be remembered as one of the brightest lights of the University of Edinburgh, and he was sure that if he had never been a professor the name of Christison would have lived in the annals of pharmacy. Mr. Young had alluded to some investigations which Professor Fraser and himself had made, but they could not have been successful without the help of the pharmacists, so that the University stood in an important relation to the pharmacists of Edinburgh. Recently this body had taken possession of a new building and the University had also taken possession of a new building and they might be able to sympathize with one another, to some extent, in the pleasure, as also in the difficulties, of the position. The University of Edinburgh should not forget that they owed their new buildings to the liberality of their friends and amongst these friends there were many of the members of the profession of pharmacists in Edinburgh.

Mr. J. B. Stephenson next proposed "The Royal Colleges of Physicians and Surgeons." He said he deemed it a very high honour that the toast had been assigned to him. When he considered that it was those great men, both physicians and surgeons, who had made the name and fame of the medical school of Edinburgh, when he considered that it was those men who represented these Colleges, or he might say composed them, he felt that he need say little more to commend the toast to the acceptance of the meeting. He supposed he might take it that the training by the different Colleges was very much the same. As far as he knew the training of both Colleges was exactly on the same lines. As he understood it, the Colleges of Physicians and Surgeons were examining and licensing bodies, and no doubt they had attracted to themselves the *élite* of the profession in every age, at least within the last few hundred years. He was much struck at the great antiquity of the Royal College of Surgeons. The meetings in connection with the tercentenary were still lingering in their ears; but in twenty years the Royal College of Surgeons would be celebrating its quarcentenary. It began in 1505, and it was difficult to say what species of practitioner the surgeon was then. There was no doubt that he was considerably differentiated now; probably he then was more a barber than anything else. The College was the oldest medical corporation or association in Edinburgh. The function of licensing was performed by it, and for the exercise of that function there were men who were the very *élite* of the profession. These Colleges had been centres which had attracted great men, both physicians and surgeons, during the last two or three hundred years. They had not only been completely trained in the medical profession, but they had also had the advantage of actual practice; and the observation which the actual treatment of disease must have afforded them constituted a very great help in the work of examining. He did not know that the Colleges had any other legal function beyond examining and licensing, but their opinion had an influence and authority on all subjects affecting the interests of the Faculty that was simply enormous. Although they were not teaching bodies, yet in connection with these colleges there had sprung up a set of lecturers, extramural lecturers, a body which had from time to time increased till they had now a fully equipped school of medicine. Its certificates of attendance at lectures were received as qualifying the candidates for examination, and the School of Medicine had besides formed a most valuable nursery for University Professors. He thought it must be in the memory of many that a great number of their leading University Professors had emanated from the School of Medicine. No doubt the relations between the corporations and the University had not always been of an amicable nature. The wars had been frequent and furious, but there had been makings up on both sides, which had been very gratifying. There had been many of these *rapprochements*. The University allowed so many of the classes to be taken at the School of Medicine; and then there were double qualifications and a conjoint Board of Examiners, by which the imprimatur of the two bodies was given. He understood that within the last few weeks there had been an examination on a still more extended scale of qualification, that the bodies in Edinburgh and the Faculty of Physicians in Glasgow had granted a certificate, this giving a treble qualification. That had taken place for the first time, and it was a very pleasant thing to see how these bodies, by conjoining together, were living as brethren should do. After referring to the part taken by the pharmacists in Edinburgh in the preparation of the first British Pharmacopœia, he said they felt that there was a bit of the medical field that they should occupy. It might be very small; still he thought it was theirs to cultivate. He thought that their curriculum for those who were to become pharmacists showed that they were progressing; and he hoped that that meeting was another step in the progress of pharmacy. They meant to peg away, and he hoped that by-and-by some of their successors would have to say "The Royal Colleges of Physicians, Surgeons and Pharmacists."

Dr. Peel Ritchie, in returning thanks for the Royal College of Physicians, said his first duty was to thank them for the honour of being present on this occasion. He was also desired to express to them the regret of Dr. Balfour, the President of the College, that he could not be present. He had likewise to thank Mr. Stephenson for the kindly way in which he had brought forward the position and functions of the Colleges of Physicians and Surgeons. On the part of the College of Physicians he begged to thank them. It was difficult for him to reply to all those points which Mr. Stephenson had referred to; but he must say that the relation of the College to the pharmacists of Edinburgh was a very close one, and, perhaps, one that was not always so pleasant as it was at the present day. By an early charter part of the duties of the College was to superintend the sale of drugs in the city. That was a duty which his predecessors in the College of Physicians performed to the best of their ability; but they had a much more dignified duty now to perform, and that was that they felt perfect confidence in those who presided over the management of the pharmaceutical department. He had no doubt that in the past such things might have occurred, as what he remembered as a joke of his student days. It was this. When a pharmacist was making u

a prescription, he found the words *pro re natâ*, which he did not understand. But remembering that a lady had recently been delivered and had introduced into the world another addition to its inhabitants, he concluded that it was for the little thing just born. Thanks to the Pharmaceutical Society these things were past; and under the presidency and guidance of the Pharmaceutical Society, no man could now enter it without being grounded in classical education. He thought they had good reason to feel that the Pharmaceutical Society was doing good work, and also doing much to elevate the profession. He had to congratulate the Society on taking possession of those elegant premises into which they were now installed.

Dr. SMITH, President of the Royal College of Surgeons, also acknowledged the toast. He said he had the honour to reply for the College of Surgeons so very frequently that he feared that words he might employ on this occasion might be looked upon by them as merely conventional. While he said that he thought, and he was sure that every Fellow in the College would agree with him, that the honour conferred on them by a society of this kind in proposing the toast of the College and receiving it so cordially was one which could not be too highly appreciated. When he said that they might look upon it as the language of convention, but he could assure them that it was not so. On more than one occasion recently he had had to express his own individual confidence in the future prospects of the medical corporations of Scotland; and he founded any opinions which he then advanced on his knowledge of what they had done; on his knowledge of the spirit with which all that had been done had been conducted, and on what he had seen and known of the numbers of professional men emanating from these bodies as licentiates, occupying prominent situations and positions all over, not only Great Britain, but the habitable globe. With regard to the University and the corporations, he could assure them that if there was at any time any appearance of anything else than an amicable feeling between these bodies, it was a mistake. What was wanted was anything that would be conducive to the general interests of the profession; and from what had been shown during the progress of the medical Bills that had come before Parliament of late he thought that they would see that the different bodies had acted conjointly and very wisely together. What they wanted was that the position and progress of medicine in Scotland should not be interfered with; and he was sure that he would meet with the approval of everyone when he said that if the powers and privileges of the medical schools of Scotland were interfered with or abrogated, it would be an unfortunate and disastrous day for the progress of medicine, not only in Great Britain, but throughout the whole world. He was not, however, going to transform an after-dinner speech into a lecture. He had to thank them for the manner in which the toast had been proposed and received. The honour had been enhanced by the toast being proposed in a society likely to forward the interests of medicine in this city and country, and to render their schools more worthy and more illustrious than they already were.

Mr. ATKINS, Vice-President of the Pharmaceutical Society, said he rose to propose a toast which in this city and company had more than ordinary significance. The city was Edinburgh and the company pharmacists. The toast was, "The Medical Profession." He ventured to make these opening remarks because he considered that Edinburgh, of all cities of the world, was the cradle and the fostering home of scientific medicine. What had they here? They had a grand University, and that University had its chairs of learning. It had its wise and thoughtful curriculum of study. It was a true University, inasmuch as it taught and examined. It examined, and the results of the examinations commanded the confidence of the world at large. They had also a noble history, to which those who lived south of it looked with fondest thought and admiration. They had had the Augustine period of literature, with such names as those of Jeffrey, De Quincey, and others, which made it one of the most brilliant in European literature. They had also in regard to medicine a noble roll-call, and he need hardly begin to mention names. They had had their grand and noble men like Simpson, Christison, and others who might be mentioned. Standing in the capital of Scotland, he thought that the toast he was about to propose was of all the most fitting. Might he not be permitted to say that no class of men could more affectionately or loyally propose the toast of "The Medical Profession" than pharmacists? He said that for a two-fold reason. First, they shared in admiration of the skill of the members of the profession. Then, as belonging to the great family of man they owed to the profession their introduction to a sphere of life; in all trials and troubles they went to the profession for their alleviation; and when at last they took their departure the profession soothed and assisted them in that departure in the kindest and most genial manner. Reference was frequently made to the fact of controversy, and to the fact of controverting each other's lines. They knew that that had been the case in the past. They knew how long it took to define the borderland, and how long after that borderland had been defined there were forays and frequent wars; but at last an honourable understanding was arrived at, and peace and prosperity prevailed. In regard to the healing art they were clearing the atmosphere; they were understanding each other better now than they did in the past. The toast of the medical profession included men of genius, men of noble gifts, men who had consecrated lofty powers in the noblest profession, and the greatest specialists of the age. But while they thought of the great men they must also think of the rank and file of the profession, often ill-paid and ill-remunerated, having often, with a great deal of self-sacrifice, to cross the moorland and the fen, called out in the fiercest weather, while others were sheltered by their firesides. When they thought of that noble army, without the excitement of popularity, doing their duty in this manner, he felt that no words to which he could give utterance would exaggerate the vast debt of gratitude they owed to the medical profession. He desired to couple the toast with the name of Professor Grainger Stewart. He had read of his work, and he was perfectly sure that he could not wish that the reply should be placed in nobler or worthier hands as representing the medical profession in Edinburgh or in Great Britain.

Professor GRAINGER STEWART said he felt embarrassed in replying to the toast, and that for several reasons. The toast had been most nobly and eloquently proposed, and the gentleman who had spoken of their profession had spoken of it in a way worthy of all its traditions and its high character and worthy of the speaker who had uttered the words. He felt a certain embarrassment also because of the kind of feeling that he saw come over his old schoolfellow and colleague, Professor Crum Brown, when he found himself replying for the University. He (Professor Stewart) confessed that he did not feel so old that he should be replying for the medical profession. Yet so it was. That experience of his reminded him of an incident that happened on the Euxine Sea a good many years ago. A rather famous Scotchman, who had become an admiral in the Russian service, after an engagement had an interview with the commander of the Turkish contingent. The Turk had expressed a desire to have an interview with the Russian admiral alone, and he was a little suspicious about it. But when they were alone, suddenly the Turkish commander pulled off his head gear and said, "Eh, mon, Sandy, it's a long time sin you and me were at the grammar school o' Aberdeen." He thought he might say to his friend Professor Crum Brown "It's a long time since we were at the High School of Edinburgh." Perhaps it was reasonable that they should be representing—the one the

University and the other the medical profession—on an occasion like this. It was very interesting to look at the way in which their profession had become developed and differentiated. They could look back to the years when the doctor was the priest to the community and when all sorts of good things were done by the same man. After a while differentiations took place. Different duties became assigned to different people. The clergy had got a very admirable position assigned to them and the medical profession had got their functions to perform. He thought that among all the functions there really were none—there were not many—which took a higher place than that which they performed in the medical profession. It had been said that they were useful in introductions into the world. He was afraid that some of them there could not claim to have done much in that way although they had done what they could, but they had in the exits from the world been able with thorough certainty to rely upon the kind assistance of the pharmacists. It was a very interesting thing to see that the pharmacist's profession had been developing in various directions, in the direction of the Universities and in the direction of the Royal Colleges, and to see that this very important branch of the profession—he thought they were entitled to call pharmacy a branch of the profession—was getting more developed and more differentiated. He liked to see that building in York Place. It looked beautiful from the outside, and they should be justly proud that they had acquired such convenient premises which would no doubt be of great usefulness to coming generations in their profession. A good deal had been said with regard to the subject of medical reform. Medical reform was a subject in which they were all very much interested, and it was always very satisfactory when they got the opportunity of putting the true state of matters before their friends from the other side of the border, especially friends who had a genial appreciation of the Scottish side of the question. The fact was that this matter of medical reform was a very important one. Medical reform was certainly wanted in many directions. But, unfortunately, somebody or other had conceived a grand idea which was essentially this, that they should have a uniform standard of examination. He was delighted to hear a speaker refer to the confidence which was reposed in the examinations of the Scottish examining bodies. He knew these examinations were very thorough. He took the liberty of saying to Mr. Mundella when he was in Edinburgh that it seemed to them a hardship that a minimum qualification should be established so that a man who had proved himself to be six feet should be obliged to go through an elaborate process to prove that he was more than five feet four inches. That put the case in a nutshell. That people who had passed an examination higher than could ever be demanded in the case of licensed practitioners should be subjected to another examination seemed to him to be a plan fraught with infinite danger, the certain danger of lowering the tone of education in many ways. He concluded by expressing how deeply he felt the kindness of Mr. Atkins and the Society for the cordiality with which the toast had been proposed and received.

Mr. William Gilmour considered himself fortunate in having the toast of "The Clergy" assigned to him, because it was one which would command their thorough sympathy. Some people thought that the profession of the clergy was so high and noble as to elevate them above ordinary enjoyments and festivities. But he was persuaded that that was not the opinion of those assembled there, but that they were all the better for their presence at such festivities, and were made more fit for their duties by social intercourse. He spoke of the influence of the clergy in Scotland, and he was persuaded that they would always come to the front when great social problems were to be considered, and there were some at the present time which required to be faced.

Dr. W. C. Smith, with whose name the toast was coupled, expressed thanks in his own name and in the name of his brethren for the very kind way in which the toast had been proposed and received. It was always a very pleasant thing to him to have it brought under his notice that the Scottish clergy still lived in the hearts of the Scottish people as they did long ago, and he believed that the reason for that was simply this, that they were not a class standing apart by themselves, but that they were in touch with all classes of the community. He believed also he was entitled to say, on behalf of all his brethren of all the churches, for he was not speaking for one church but for the whole, that they were all very anxious to do faithful honest service for the people of this land. There had been times when they had had much more able and eloquent preachers than any of them could pretend to be just now; but he did not know he could point to any time when all the churches of the country had been on the whole filled with a class of men more earnestly desiring to labour faithfully at the bit of work which God had laid to their hands. Perhaps it was also to their credit that they were not disposed to meddle too much, as sometimes people had thought, with business that did not properly belong to them. His friend Dr. Stewart had referred to the differentiation of professions and of the confusion of them which once existed. They of the clergy still believed, and he hoped would always believe, that it was their business to see, as far as lay in their power, to the wellbeing of the whole mass—body, soul and spirit. At the same time he had not the slightest desire for his own part to prescribe on behalf of the ailments of the community nor to administer drugs to any of his congregation, and they were quite willing also to leave the education of the people's intellects and the administration of palmies to the schoolmaster. But while they were left quite free to occupy themselves with the spiritual wellbeing of the people, they did take an interest in the whole material wellbeing of the community. He thoroughly believed ministers were striving to do that service to the land. On that account he accepted that toast they had now proposed as one of the most pleasant experiences of the kindly feeling of his fellow countrymen towards them. He did not know any part of society that was more nearly connected with the clergy than the medical portion. They had harmoniously co-operated from the beginning of Christianity in the healing of the poor body as well as soul. It was well that there should be special departments, but they would, nevertheless, still look to maintaining that grand old commencement of Christianity, and he was sure they would succeed. If, for instance, that terrible plague which had been desolating some parts of Europe and whose cloud was hanging ominously over Paris just now; if it came to this country, as God forbid it might; if they found, as they would find, the physicians as heretofore at the post of duty and pharmacy taking part in providing wholesome and unfailing medicines, they would not look in vain to the ministry of this country. They would not run from their posts, but take part side by side with the healing profession and would also do what they could to stir up that enthusiasm for humanity which belonged to the church to stir up to provide an efficient agency for carrying on the duties that would be laid to their hands.

Professor T. R. Fraser said he considered it a very high honour that as a guest of the North British Branch of the Pharmaceutical Society of Great Britain he should be allowed to propose a toast. He expressed, in the first place, his own sentiment and the sentiment of the other guests in acknowledging in the most hearty manner the sumptuous and kindly hospitality which they had received from the members of the North British Branch. He could not refrain also from congratulating the Branch on the very auspicious occasion upon which they met—in order to take part in inaugurating the entrance of this portion of the Society into these extremely commodious and, as they had heard, elegant buildings in York Place. He expressed the most cordial and hearty hope of the guests that the usefulness of the

Society in these buildings might be continued in as prominent and successful manner as it had been in the buildings which it had just left. His toast was one which he felt quite sure would be very cordially accepted, as it was that of "The Pharmaceutical Society of Great Britain"—a body, an institution which had already conferred the very greatest advantages upon a large portion of the most valuable workers of the community, and he believed also a very important benefit upon the public at large and upon the medical profession. He did not propose to enter upon historical topics, but he could not refrain from adverting, at any rate, to the fact that previous to the time when medicine and pharmacy were recognized as distinct and separate the practice of these professions was, to a very large extent, in the hands of incompetent and illiterate persons. He found confirmation of that in the preamble of the first Act of Parliament relating to the medical profession, where it was stated that the practice, both of pharmacy and medicine, was at that time very largely in the hands of such incompetent persons as common artizans—as smiths, as weavers, and even, he believed it was stated, of old women. In order to protect the subject, and likewise to stimulate progress, legislation defining the qualifications of medical practitioners and various Acts of Parliament were passed for the purpose of ensuring that these qualifications should be possessed by those who were admitted to the practice of medicine and surgery. Pharmacy, however, remained for a long time in the hands of the medical profession, or of other altogether incompetent persons. It was not until long after this time that the Society of Apothecaries was founded, and that no doubt gave a great impetus to the study of pharmacy. But very shortly the members of that society forsook the interests of pharmacy in order to apply themselves to the practices of medicine and surgery. The education in pharmacy was to all intents and purposes neglected. The qualifications which should allow him to practise his art were not in any effectual manner defined, and although in that body many were pharmacists, there were at that time a very large number of men, as there were now, of the highest intelligence and knowledge, who were very properly and very naturally ambitious to raise the position and qualifications of pharmacists. But he need scarcely say in that meeting that these wishes were altogether unfulfilled until the Pharmaceutical Society of Great Britain was founded in 1841 by Jacob Bell—a man whose name must always be remembered as being intimately associated with one of the greatest educational reformations that had ever been accomplished in this country. Very soon after branches of this Society were instituted in various parts of the country, among the most important of which he believed he was correct in saying was this Branch whose guests they were to-night. Examination boards were founded in these various parts of the country, and the education and qualifications of the chemists and druggists were placed in a position eminently satisfactory as contrasted with the former condition of things. This Society, therefore, had exerted an extremely beneficial influence in elevating, he believed, the position of druggists and pharmacists of this country, and he believed, quite as highly in conferring great benefits on the public and great benefits likewise on the medical profession. As a member of that profession, he most cordially hoped the Pharmaceutical Society would continue to prosper and to flourish. He felt sure that the present officials of that Society were determined that no effort would be wanting on their part to increase the useful and successful previous efforts of the Society to do good to the druggists and chemists of Great Britain. As a well wisher of the Society he had listened with very great pleasure indeed to some remarks which were made by a gentleman present, when he told them that the policy of the Society with regard to its members would not in future be made too much dependent on examinations, but that he was of opinion that a carefully devised scheme of education should be instituted, and that candidates for the important profession of pharmacy should be educated under a defined curriculum, by teachers of recognized and well-known efficiency in these departments. So far as he could gather the future education of pharmacy was not to be so much in the direction of training men to pass examinations as of training them to have an actual and real knowledge of the subject in which they were to pass. He felt quite sure that these and many other matters of very great importance might, with the utmost confidence, be entrusted to the President and officials of the Pharmaceutical Society of Great Britain. The present President was a gentleman whom they were all quite able to appreciate, the great merits of whom they all knew, as a man of the greatest business talents, of high scientific knowledge, of the utmost devotion to the welfare of the Society he so ably presided over, and, therefore, it was that he had the utmost confidence in proposing for their most hearty consideration and acceptance the toast of "The Pharmaceutical Society of Great Britain," coupled with the name of its most eminent President, Mr. Carteighe.

Mr. CARTEIGHE, in replying, said that those of them who came from the South, to see such a gathering as that and to hear such warm sentiments expressed towards the Society over which he at that moment had the honour to preside was extremely cheering. There was one thing in connection that struck him as particularly characteristic of Scottish pharmacists, that was their patience. He had occasionally to preside over convivial gatherings of that sort, but he never found the medical profession or the pharmacists in the South so patient as he found them to-night in regard to the intellectual part of the proceedings; but they had no great capacity for speech-making in the South. It was a fact that he had listened with the greatest pleasure to a number of excellent speeches, but he thought it would be unjust to ask them to bear much from him. He was one of themselves, and he was not there to speak of their merits, but rather to point out demerits—to point out where they were, and if possible, how they were to be met. He would therefore, without further preface, thank Professor Fraser for his very kind allusions to the Society, and for the very clear and explicit account of the objects that Society aims at. Just as a matter of historical accuracy, or rather reminder, he said it was curious that at the foundation of the Society in 1841, the first President was a distinguished man of science, a lecturer on chemistry, who was allied to a distinguished medical school, and besides having all the qualifications to hold these, he was a politician and a philanthropist; he referred to Mr. William Allen, Lecturer on Chemistry in Guy's Hospital. The little band of men who began to consider whether for the interests of the great mass of pharmacists and the public at large, it was not desirable that something like a systematic education should be begun at that time received the sympathy of their medical and scientific brethren. That so distinguished a man as William Allen should consent to be their first President, marked a stage in the history of the Pharmaceutical Society. Its objects were primarily to promote education and to educate, and for a number of years as far as its means would allow, it began to educate by establishing a school, and in other ways promoted education, and by-and-by arose the gentleman who might be said to have been the real founder of pharmacy as they now knew it and by statute incorporated, Jacob Bell. The first period was under William Allen, and the second period began when Jacob Bell went into Parliament to advocate the interests on public grounds of giving Parliamentary powers to such a Society, and the third and practically the final period was in 1868, when George Webb Sandford succeeded in getting a complete charter of examination so to speak. That was to say that up to the year 1868 and from the year 1841 the Pharmaceutical Society was a purely voluntary body, simply doing the best it

could to give a guarantee to the public that the persons who held its licence were competent to dispense medicine with safety and advantage to the public. But in that year, mainly through the untiring devotion of George Webb Sandford, it was decided by Parliament that it was in the interest of the public that every person who dealt in dangerous compounds and had to dispense them for the cure of the sick should possess such a knowledge as should afford a guarantee to the public that the compounds sold would be properly dispensed and compounded. In 1851, or thereabouts, in connection with the history of the Society in Scotland, there was a desire, an active desire, on the part of many eminent pharmacists in Edinburgh and in Scotland generally to assist Jacob Bell and his coadjutors in this great reform in the matter of the education of the druggists. It was resolved that it was desirable that every Scottish pharmacist should do what he could to enlist support, and that the pharmacists of Scotland should join the Society, and thus by their personal sympathy and financial aid—because all these years they had been asking from their examined men and their unexamined men continuous subscriptions which were spent for the benefit of the public—they assisted materially in preparing the way for the passing by the Legislature of the Act of 1852, which was passed at the instigation of Jacob Bell. Now they were just entering upon another stage, at all events of local history. The Society which had done what it could from its foundation to promote education, not in London alone but all over the country, wherever it was possible — that Society had thought, and very wisely thought, that in such an eminent city as Edinburgh, a city associated with so much of the higher intellectual education of the world—and they had heard all about it that night—they had thought, ignorant as they sometimes were in the South of what took place in the far North, that it could not be otherwise than beneficial to the community at large and satisfactory to their members north of the Tweed if they could place at their disposal a house suitable for the purpose of examinations and the promotion of education. And the formal opening of that house would be celebrated on the following day. He thought that the result of the deliberations of the Council of the Pharmaceutical Society in regard to taking that step and of the exertions of the Committee who took charge of the details of the building would be highly gratifying to them and would conduce to the prosperity of the Pharmaceutical Society at large, and, he ventured to think, the advancement of true scientific pharmacy. He might say finally, and in the presence of the distinguished guests from the City of Edinburgh representing medicine and science that he saw around him, that the Pharmaceutical Society was not a training body and it did not aim solely at preparing men for a certain standard of examination. That was one of its functions by law established. But it aimed further at giving as great facility as possible for men of five feet four in stature to become six feet men if they liked. It was because the pharmacists desired that there should be as many six feet men in pharmacy as there were in medicine that that housein York Place had been furnished.

Professor REDWOOD gave the toast of "The Scottish Pharmacists." The subject of Scottish Pharmacy was one which had been very frequently brought before them for a great many years. Having himself been associated with the Pharmaceutical Society from its earliest rise, having also been in the early years of the Society very closely associated with the gentleman whose name they had already heard, and who took so active a part not only in establishing the Society, but in promoting its introduction into this part of the country, it had frequently, he might say constantly, been a question of discussion and consideration as to how they could induce the pharmacists of Scotland to co-operate with those of England. At the establishment of the present Society there was a sort of feeling which was now and then expressed that it was rather special in its character—that it partook more of a London Association than a British Association, and that arose from the necessary circumstance that the Council of the Society in the first instance was entirely composed of London men. But there was a constant desire expressed that they should be able to induce pharmacists throughout the country, and Scottish pharmacists especially, to unite with the English Pharmaceutical Society, and great efforts were made in that direction, which were without much effect in the first instance. Mr. Bell came to Scotland and endeavoured to induce Scottish pharmacists to join, but there was a great amount of shyness manifested and expressed. He had not himself a very strong feeling in favour of love at first sight; and, undoubtedly, Scottish pharmacists were of that opinion also. As their President had said, it was not till ten years had elapsed from the time the Society was established in England that the Scottish pharmacists could be induced to take any active part in co-operating with them. He thought they might go further and say that nearly twenty years elapsed before the Scottish pharmacists came to the front very strongly in support of what was being done by those on the other side of the border. He hoped the practical result of their meeting there that night would be to induce a far greater amount of co-operation on the part of the Scottish pharmacists than had hitherto taken place. As the result of his own observations and experience he entirely concurred in what had been stated that the pharmacists of Scotland were not one jot behind the most eminent pharmacists in any part of the country. He was quite sure there were in Scotland a very large number who had not joined the North British Branch of the Society, who nevertheless occupied a position and had a standing as pharmacists which rendered it extremely desirable that they should be induced to become members of the one Association. And seeing they were now about to have in this city a permanent establishment well fitted for all the purposes that were contemplated, it was the more desirable that Scottish pharmacists generally should be associated with the Society.

Mr. DANIEL FRAZER (Glasgow), who replied, said he was one of the very oldest working dispensers in Scotland. He had been working at it for fifty-four years. He gave an idea of how the profession had increased in Glasgow and how it had changed by stating that on looking over the 'Glasgow Directory' for 1813, he found there were ten druggists to do the whole of the pharmaceutical work for Glasgow. But there were also twenty-three surgeon-druggists—surgeons who professed to be druggists as well as surgeons—forty medical men and druggists, one patent medicine man and a man who had a soda water shop. He spoke of the establishment in that city of the Apothecaries' Company, and expressed the opinion that if the conditions for entering pharmacy in the future were made too stringent the business would be left very much to the medical profession.

MR. H. BELLYSE BAILDON proposed "The Guests," and spoke of the honour which the members of the Society felt in being able to bring together so many men who added lustre to the medical and scientific professions.

Mr. JOHN WILLIAMS briefly replied.

Dr. YOUNG (Portobello) proposed "The Chairman." Generally, it was said, that when Scotchmen crossed the border, they did not find their way back. In England, Scotch always got a ready welcome, and in Scotland, Englishmen got the same. Their Chairman that night was an Englishman. He was sure the principle was maintained in him *Palmam qui meruit ferat.*

The CHAIRMAN, in the course of his reply, expressed the hope that the inauguration of the new buildings would give an impetus to pharmacy in Scotland and that it would reach a higher standard than it had yet attained. They were deeply indebted to the many eminent citizens, the many eminent professors and gentlemen con-

nected with the medical profession, who had favoured them with their company and had given them their sympathy in the work they had in view.

Mr. J. G. F. Richardson proposed "The Croupiers," coupled with the name of Mr. Borland, who replied.

Dr. Paul gave "The North British Branch of the Pharmaceutical Society of Great Britain." He spoke of the way in which the Branch co-operated with the parent Society for the benefit of both, and of the efficient work done by its examiners, and he coupled the toast with the name of Mr. Peter McEwan.

Mr. McEwan, in reply, thanked them for the toast and the way it had been received, and said he would always do his best to perform the Society's business in Scotland and to increase its prosperity.

The meeting, which was a very pleasant and enjoyable one, terminated with the singing of "Auld Lang Syne."

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of the Society was held on Wednesday, November 5, at the rooms, 11, Harcourt Street, Dublin, at three o'clock.

The President, Mr. James A. Brunker, M.A., in the chair.

The other members of the Council present were:—Sir George Owens, Professor Tichborne, Dr. Collins, Messrs. Allen, Doran, Hayes, Hodgson and Simpson.

The Registrar, Mr. Arthur T. Ferrall, read the minutes of the last meeting.

A letter, dated October 27, was received from Mr. T. R. Connolly, of 107, Upper Georges Street, Kingstown, which stated that in October, 1882, he passed the Matriculation examination of the Queen's College, Cork, with the intention of substituting that for the Preliminary examination of the Pharmaceutical Society. After he came to Dublin he applied for a certificate of having passed the examination, but was informed that the ordinary certificate was only issued to those who studied in the College. Professor Jack, the Registrar of the College, had, however, written a letter to his father stating that he had been admitted a matriculated student. The writer desired that this letter should be accepted as sufficient proof of his having passed the examination, as he wished to present himself at the Pharmaceutical Society's January examination for the licence, and was in every other respect qualified to do so.

The President said, the only question was whether the Council deemed the Registrar's letter sufficient evidence that Mr. Connolly had passed the Matriculation examination of the College.

Mr. Hodgson: Do we accept the Matriculation examination of the Queen's College, Cork?

The President: Yes; it is one of those recognized by the Medical Council.

Mr. Hodgson said Mr. Connolly's father was a member of a highly respectable firm in Dundalk.

Mr. Doran: Is the applicant of age?

Mr. Hodgson: Yes.

On the motion of Dr. Collins, seconded by Mr. Hodgson, the letter of the Registrar of Cork College was accepted as sufficient evidence that Mr. Connolly had passed the Matriculation examination there.

The Registrar stated that a donation had been received from the Smithsonian Institution, Washington, of a copy of their Report for 1882.

Professor Tichborne moved, that the thanks of the Council be forwarded to the Secretary of the Smithsonian Institution.

Sir George Owens seconded the motion, which was agreed to.

The President said, the report of the Law Committee contained a complaint from a licentiate in Belfast, of the irregular sale of poisons by a firm in Belfast, and made a recommendation thereon.

On the motion of Sir George Owens, seconded by Mr. Doran, the report was adopted.

A report of Dr. John William Moore, who conducted the Preliminary examination of candidates, stated that 10 candidates had presented themselves for that examination of whom 8 had passed.

The report of Dr. George F. Duffey, Professor Davy and Mr. Charles Evans, examiners for the licence, stated that only one candidate, Mr. William John McDade, had presented himself and that he had passed. His marks were as follows:—Botany, 10 out of 40; materia medica, 40 out of 60; chemistry, 76 out of 100; pharmacy, 65 out of 100; total gained, 191.

The President remarked that Mr. McDade's marks in botany were very low. The other marks were fairly good.

A member of the Council suggested that the certificate should be withheld.

Professor Tichborne: The Council have nothing to do with the examination. They can only change the examiners. They cannot veto their return; if they did so they would be constituting themselves examiners.

The President: We have power to call the attention of the examiners to our opinion as to the answering.

Mr. Allen said he had a resolution on the subject of the requisite answering at examinations, which he had not yet been able to move.

The President: We can only accept the report.

Some financial business having been disposed of, the Council adjourned.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, November 6, Dr. W. H. Perkin, President, in the chair.

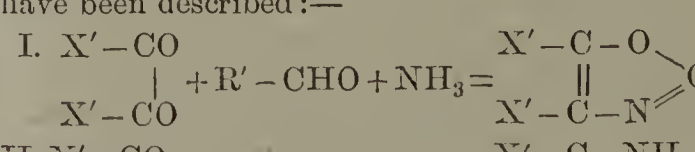
The following certificates were read for the first time:—

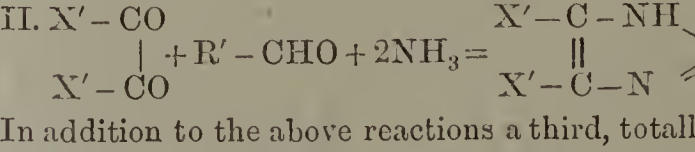
W. G. Brown, Sir B. V. S. Brodie, W. Briggs, M. T. Buchanan, Rev. W. H. Eley, J. Frost, T. P. Hall, H. J. Hodges, H. Jackson, F. Johnson, C. W. Low, F. M. Mercer, W. F. Pankhurst, V. E. Perez, A. Rickard, E. G. Smith, H. Smith, K. B. B. Sorabji, R. R. Steele, W. Tate, G. Thorn, P. C. Thomas, J. H. Worrall, T. Wilton, W. H. Wood.

It was announced that a ballot for the election of Fellows would take place at the next meeting (November 20).

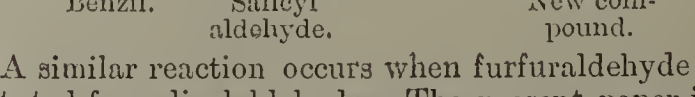
Dr. Japp then read a paper—

On the Action of Aldehydes and Ammonia upon Benzil—continued. By F. R. Japp and S. C. Hooker.—In former communications relating to the joint action of aldehydes and ammonia upon compounds containing the dicarbonyl group (–CO–CO–) two general reactions have been described:—





In addition to the above reactions a third, totally distinct reaction occurs. Thus—



Benzil. Salicyl aldehyde. New compound.

A similar reaction occurs when furfuraldehyde is substituted for salicylaldehyde. The present paper is devoted to an account of this new reaction and to a study of the compound obtained with salicyl aldehyde. The authors represent this new reaction generally—

III. $$\begin{matrix} X'-CO \\ | \\ X'-CO \end{matrix} + 2R'-CHO + 2NH_3 = \begin{matrix} R'-CH-NH-CO-X' \\ | \\ R'-CH-NH-CO-X' \end{matrix} + 2H_2O$$

Action of Salicyl Aldehyde and Ammonia upon Benzil.—Equal weights of salicyl aldehyde and benzil were dissolved in alcohol with the aid of heat and the warm solution saturated with gaseous ammonia. The new compound separated as a lemon-yellow crystalline powder. It was filtered off, extracted with boiling alcohol, and further purified by solution in boiling phenol and reprecipitation by alcohol. It was thus obtained as a white crystalline sandy powder, darkening when heated, fusing at 300°, almost insoluble in alcohol, ether, glacial acetic acid, etc. Analysis indicated the formula $C_{28}H_{24}N_2O_4$. This substance dissolves in boiling caustic soda and is reprecipitated almost unchanged by hydrochloric acid, if fused with caustic soda it yields benzoic and salicylic acid. When acted upon by dilute hydrochloric acid (1 to 2) at 210° benzoic acid and the hydrochloride of a new base were formed. This base after precipitation by ammonia, etc., was found to have the composition $C_{14}H_{16}N_2O_2$. Its platinum salt, hydrochlorate, sulphate and picrate were prepared and examined. When fused with caustic soda this base yields salicylic acid. The authors believe the constitution of this base to be $\begin{matrix} C_6H_4(OH)-CH-NH_2 \\ | \\ C_6H_4(OH)-CH-NH_2 \end{matrix}$ and have named it dihydroxystilbenediamine. By the action of acetic anhydride upon the condensation product a diacetyl derivative was obtained $C_{28}H_{22}(C_2H_3O)_2N_2O_4$, and by a further action of acetic anhydride a body with the formula $C_{22}H_{24}N_2O_6$ was formed; its reactions show it to be diacetyldiacetoxystilbenediamine. It yields no benzoic acid when treated with potassium permanganate. By acting on the body $C_{22}H_{24}N_2O_6$ with caustic potash, precipitation with hydrochloric acid, etc., a substance $C_{18}H_{20}N_2O_4$ (diacetyldihydroxystilbenediamine) was obtained. By the continued action of potash all four acetyl groups were removed and the base dihydroxystilbenediamine was formed. This can also be effected by heating the compound $C_{22}H_{24}N_2O_6$ with concentrated hydrochloric acid in sealed tubes. The action of benzoic anhydride upon the condensation product has also been studied, a dibenzoyl derivative $C_{28}H_{22}(C_7H_5O)_2N_2O_4$ was obtained which proved to be identical with the tetrabenzoyl derivative of the base. The condensation product is therefore dibenzoyldihydroxystilbenediamine. The authors have also studied the action of furfuraldehyde and ammonia upon benzil. Two isomeric bodies $C_{24}H_{20}N_2O_4$ were obtained.

Mr. S. U. PICKERING then read a paper entitled—

Isomeric Modifications of Sodium Sulphate.—The author has determined the heat of dissolution of sodium sulphate, he has used the apparatus of Berthelot (*Mec. Chem.*, i., 140). He allowed a large quantity of sodium sulphate to effloresce till nearly anhydrous, various portions were then dried at different temperatures. From the author's results it is evident that there are two modifications of sodium sulphate. All the specimens not heated above 150° gave 57 cal. as the value of the equation $Na_2SO_4 + 42\,0H_2O$. Specimens heated above this temperature up to the fusing point indicated the existence of a modification dissolving with +760 cal. The existence of the salt in two different forms may explain the discrepancies in the results arrived at by various authors.

The Secretary then read a paper—

On some Vanadates of the Amines. By G. H. BAILEY.—The author has prepared and carefully studied the properties of a considerable number of these compounds. His results may be summed up as follows: that considered alongside the vanadates of the alkali metals the orthovanadates of the amines are as difficult to prepare as the corresponding potassium salts, whilst sodium orthovanadate crystallizes readily. The metavanadates of the amines are much more soluble than ammonium metavanadate, but in their general characters and reactions they resemble the ammonium salt. The derivatives of the primary amines crystallize well, but the further introduction of alcohol radicals decreases the stability of this series of salts. The salts containing the ethyl radical seem to be at least as stable as the corresponding compounds containing methyl. The optical characters of the red vanadates show that they belong to the monosymmetric system.

The Secretary then read a paper entitled—

Contributions to our Knowledge of Acetacetic Ether. Part I. By J. W. JAMES.—The author commenced this research with a view of obtaining some insight into the reactions of acetacetic ether and to establish its formula. The author first gives an account of the action of dilute acetic acid on sodium ethylacetacetic ether; there seems to be no doubt that ethylacetacetic ether is formed. Some mixed dialkyl acetacetic ethers were then prepared with a view of ascertaining whether the order in which radicals were introduced was of importance or not. The author could not prove that allylmethylacetic ether was identical with the methylallyl ether, on account of the difficulty of obtaining these bodies in the pure state. The methyl ethyl derivative seemed to be the same as the ethylmethyl body. Acetylacetacetic ether was prepared and also its copper, nickel and cobalt derivatives. The actions of water and sodium ethylate on this body have been studied. Methylacetylacetacetic ether and benzoylacetacetic ether have also been prepared and examined.

The two following papers were also read by the Secretary:—

On Magnesium Hydrosulphide Solution and its use in Chemico Legal Cases as a Source of Hydrogen Sulphide. By E. DIVERS and TETSUKICHI SHIMIDZU.—The authors wishing to obtain a regular stream of pure hydrogen sulphide found that this could be effected by gently heating a solution of magnesium hydrosulphide. Ordinary hydrogen sulphide (from ferrous sulphide and hydrochloric acid) is passed into water containing magnesia in suspension. The gas is absorbed and the magnesia dissolves. The decanted solution is colourless, and when heated to 60-65° evolves a steady stream of hydrogen sulphide free from hydrogen and hydrogen arsenide. The magnesia which is precipitated during the evolution of the gas can be reconverted by cooling and passing hydrogen sulphide.

On the Origin of Calcium Thiosulphate, an Emendatory Note to a Paper on the Calcium Hydrosulphides. By E. DIVERS.—After a detailed examination of the various reactions in which calcium thiosulphate is formed, the author concludes that there is essentially but one method of forming this salt, viz., the union of sulphur with calcium sulphite.

Parliamentary and Law Proceedings.

EXPLOSION WHILST PREPARING COLOURED FIRES.

The adjourned inquest as to the death of Edward Harris Crimp, 17, chemist's apprentice, who was killed by an explosion in Mr. Joseph Balkwill's shop, at Kingsbridge, was held on Thursday, Nov. 6, before Mr. S. Hacker, county coroner. Major Cundill, H.M. inspector of explosives, was in attendance. Mr. Square, solicitor, watched the proceedings on behalf of Mr. Balkwill.

The Coroner, in opening, commented upon the serious nature of the proceedings, and warned Mr. Balkwill that he was not obliged to answer any questions which might criminate himself.

Mr. Joseph Balkwill stated that on October 30, his junior apprentice, Edward Crimp, and himself were making "red light" in witness's chemist's shop in Fore Street, Kingsbridge. The component parts of the mixture

were nitrate of strontia, 10; chlorate of potash, 3; shellac, 1; sulphur, 2; and charcoal, ¼th. It was between five and six o'clock when they commenced mixing these articles, and he cautioned the deceased that certain parts when put together were explosive, and further told him that he (witness) would put the powders into the mortar in the order in which they should come. While the nitrate of strontia was drying in the oven deceased proceeded to powder the chlorate of potash in an iron mortar with an iron pestle. Witness meanwhile was weighing the other ingredients. He placed the sulphur on a piece of paper behind the dispensing screen, there being a piece of mahogany about two feet high between the deceased and the sulphur. He did not tell the deceased he had so placed the sulphur, and there was nothing to indicate that the apprentice noticed him do so. He then went towards the kitchen to get the nitrate of strontia. Witness stopped at the door leading to the kitchen for about two minutes talking to his wife, and then the explosion occurred. He ran out of the side door, and into the front door of the shop, and called on Frank Horsman, a former shopboy of his, who happened to be on the premises. Horsman answered, but Crimp he could not find. Mrs. Balkwill, witness's little child, and an errand boy were also in the shop at the time of the occurrence. When the explosion took place witness came to the conclusion at once that deceased had mixed the sulphur with the chlorate of potash. The shop was obscured and in darkness when he reached it. He called to deceased, and he replied, "Here I am, sir." Witness carried him to the centre of the shop and saw at once that he was fatally injured. Crimp was afterwards carried into the house and there died, Mr. Webb having previously been sent for. When witness went round the shop shortly after the explosion he did not see the sulphur. They intended making 2 lbs. and a half an ounce of "red fire." Witness had no licence from the local authority for manufacturing explosives.

Coroner: Have you a licence from the Home Secretary?

Mr. Square thought the question was rather asking Mr. Balkwill to criminate himself.

Cross-examined by Mr. Square: He never intended deceased to put the sulphur in the mortar.

By the Inspector: Crimp had been his apprentice for seven or eight months. The red fire was for the use of the apprentices, and was their "perquisite." It was usual for them to have it at this time of the year. They generally made it themselves with witness's consent, and used it for illuminating the streets as a sort of fireworks.

By the Jury: It had been an annual custom for the apprentices to make this "red fire."

A Juror: Have you ever made red fire and sold it?

Mr. Square objected to the question.

Francis Horsman, a former errand boy of Mr. Balkwill's, stated that when he was in the shop on the 30th he saw Mr. Balkwill weigh the sulphur, and put it behind the dispensary screen. He did not hear Mr. Balkwill say anything. Witness was standing in the passage leading to the inner shop when the explosion occurred. From this point witness corroborated Mr. Balkwill's evidence.

By the Inspector: Witness had been an errand boy for four years with Mr. Balkwill. It was customary at this time of the year for the apprentices to make red fire for their own use. He had seen it sold sometimes by the apprentices in the shop. Could not say that he had ever seen Mr. Balkwill sell any. If anyone wanted, say, two-pennyworth of red fire at this time of the year they could buy it at Mr. Balkwill's shop.

Mr. W. H. Webb, surgeon, stated that on the day of the explosion he received a message to go to Mr. Balkwill's. He there saw Edward Crimp. He found the deceased's injuries so extensive that they admitted of no treatment and he remained with the boy until he died, about twenty minutes or half an hour afterwards. Deceased made no statement.

Major Cundill, being sworn, stated that Mr. Balkwill did not hold a licence from the Home Secretary to manufacture explosives. Chlorate of potash and sulphur were largely used in the manufacture of fireworks. By themselves those substances came within the fulminate class.

By Mr. Square: He gave Mr. Balkwell the usual warning when he called upon him that day, but Mr. Balkwill, as far as he knew, concealed nothing.

Mr. Dore, ex-superintendent of police and inspector of explosives appointed by the local authority, stated that Mr. Balkwill held no licence for manufacturing explosives.

By the Jury: He had seen squibs and rockets and other things about the town on every 5th of November, but he had never inquired where they came from, and had never warned the druggists against making them.

The Foreman thought this showed some neglect of duty on the part of the local inspector.

The Coroner, in summing up, explained that if, by the commission of an illegal act, a person's death was caused, the person committing that illegal act was technically guilty of manslaughter by the law of England. It was for them to apply that principle to the facts before them. As an illustration of what he meant he might recite a well-known case. A man was shooting his neighbour's poultry, and while he was so doing an accident occurred which resulted in the death of a third party. The shooting of the neighbour's poultry was an illegal act, and upon the principle he had stated the man firing the gun was guilty of manslaughter. It was for them to say also from the evidence whether anyone had been guilty of negligence, and whether that negligence amounted to culpability or criminality. The Act relating to the manufacture of explosives—which Mr. Hacker quoted—defined explosives, among other things, to be "coloured fires and every other substance used to produce explosion or pyrotechnic effect." Taking that definition they could come to no other conclusion than that Mr. Balkwill, in manufacturing this "red fire" was manufacturing an explosive, and the 4th section of that Act stated that the manufacture of such explosives should not be carried on except at places lawfully existing or licensed for the same under that Act. They heard that Mr. Balkwill had no licence from either authority by which such licences were issued, and they would probably come to the conclusion that in making this red light he was committing an illegal act. Mr. Balkwill—they would all recognize—had given his evidence very fairly and very clearly, and they would notice the precautions he adopted and the caution he gave to the deceased. Mr. Hacker then briefly ran through the chief points in the evidence, and, in conclusion, said—"You can, I think, come to no other decision than that the deceased met his death as a direct consequence of the making and mixing of these explosives, and the making of these explosives being an illegal act, I am afraid, gentlemen, you can do no other than return a verdict of manslaughter."

The jury then retired, and after about half an hour's consultation the foreman handed to the coroner a written verdict, in arriving at which he said they had been unanimous. It ran:—"The jury find that the deceased, Edward Harris Crimp, met his death by the explosion of chemicals, which explosion was caused by inadvertence in his employer's shop."

The Coroner: Then you mean by that that the death was accidental?

A Juror: It amounts to that.

The verdict was then recorded and the proceedings terminated.—*Western Morning News.*

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"New York Medical Journal," *August* 1880,
Dr. F. Weir,
in Lecture delivered to the College of Physicians and Surgeons, New York.

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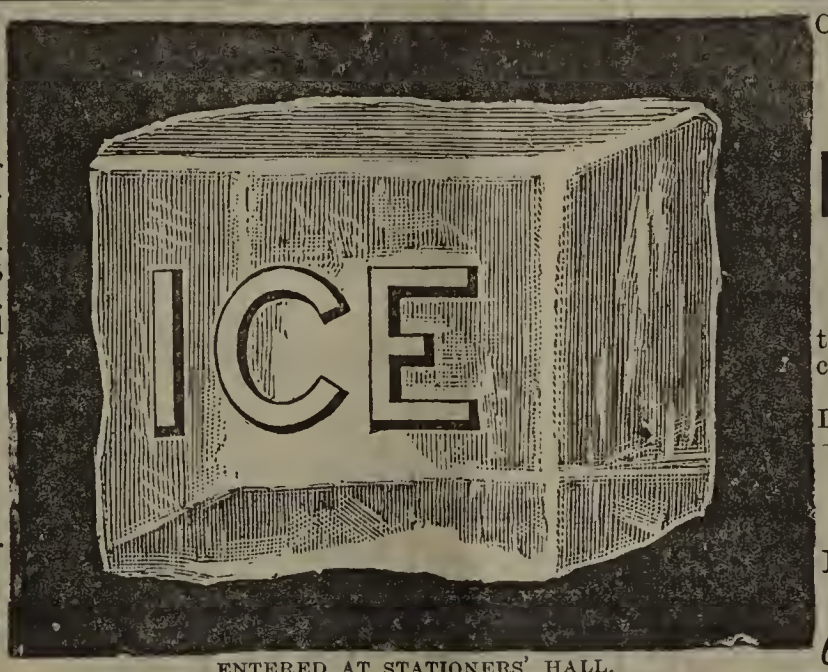

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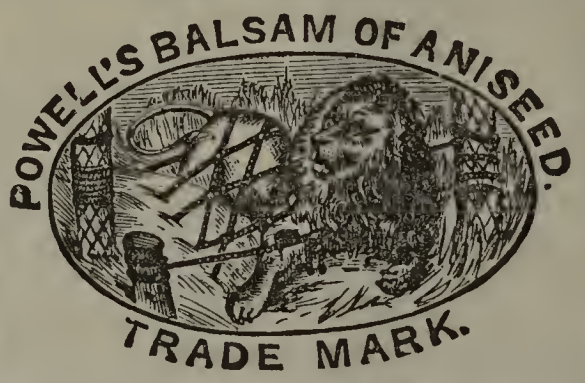

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SPECIALITÉ BOXES.

The lid removes, and the box serves as a holder for the Cone.

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Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

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"The postal system, which Mr. WILLS has introduced and carried out with the most complete success, is an extraordinary advantage to Pharmaceutical students living in the country, as it tenders them an opportunity of working at their own quarters, miles away from London, assisted by an efficient London master. We have visited Mr. WILLS' establishment, and, having thoroughly gone into every particular in connection with the working of the system, have much pleasure in recommending it. With the facilities Mr. WILLS has at command, we can scarcely wonder that the whole of his students pass without difficulty."—*The Magazine of Chemistry and Pharmacy.*

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Messrs. WILLS & WOOTTON,
Trinity Square, London, S.E.

THE
CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:
173, MARYLEBONE ROAD N.W.

At the Examinations held last month, the following Students of this School were successful:—

MAJOR.
Mr. F. JACKSON.

MINOR.

Mr. H. S. ANNAL	Mr. C. H. F. MENHINICK
„ J. BARTON	„ J. REES
„ J. W. BOWES	„ J. W. RICHARDS
„ J. R. CAVE	„ W. S. STEEPLES
„ J. B. FRANCIS	„ W. T. TUDOR
„ J. GREGSON	„ J. H. WALDRON

The next complete course will commence on January 2nd, 1885.

For Prospectus apply to
Messrs. LUFF & WOODLAND.

LIVERPOOL
SCHOOL OF PHARMACY.
36, Oxford Street, Liverpool.

Principal: J. S. WARD, M.P.S., Ph. Ch.
(*Prize Medallist and South Kensington Prizeman.*)

RESULT OF THE OCTOBER EXAMINATIONS.

5 Minor men were sent in, 4 passed; 1 Preliminary man was sent in, 1 passed; viz.:—

Mr. W. H. HAYWOOD ... ... Liverpool.
„ A. C. OLDS ... ... Liverpool.
At the London Exams.
„ J. T. HORNBLOWER ... Birmingham.
„ GEO. LUNAN ... ... Banchory Ternan.
At the Edinburgh Exams.
„ C. F. PARKER (Preliminary) Liverpool.

Of these 5, 4 passed on their first attempt, the other at his second; nor is this any new experience, for out of the last 9 that have passed from this School, 7 have been successful on their first attempt, and the other 2 on their second. To appreciate these figures it is necessary to compare them with the total results of the Examinations at both centres, which are—

In London, 105 were examined, only 34 passed.
In Edinburgh, 47 were examined, and only 23 passed.

Candidates for the January or February Examinations should enter at once. Next year's classes commence on January 6th, and several benches are already taken for the April Examination.

Prospectus, with full particulars of the School, sent free on application.

× × × ×

PRIVATE TUTOR
Mr. JAS. W. SAUNDERS
(*From the Royal School of Mines*),
6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.

WHAT IS THE CAUSE OF THE GREAT MORTALITY AT the recent Examinations? Want of systematic, *individual* guidance by a long experienced and most successful tutor. Why attend long, expensive courses at public schools, when a few weeks private tuition with me will suffice? NO demonstrators. Postal Students receive my notes, thereby placing them on a par with my private pupils. Books unnecessary, notes sufficient. Preliminary Candidates prepared privately or by post. Enclose stamp for terms, &c.

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PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, Gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium, 100 Plants, 5s.

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INSTITUTED 1ST OCTOBER, 1868.

325, KENNINGTON ROAD, S.E

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

SEVENTEENTH SESSION, 1884-5.

The next term will commence on the 7th January, 1885.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

WESTMINSTER COLLEGE
OF
Chemistry & Pharmacy.

The next Course of Lectures on Chemistry, Botany, Pharmacy, Materia Medica and Physics will commence on Monday, January 5th, 1885.

Students can enter at any time, but are advised to enter at the commencement of a Course, and are requested to send in their names as early as possible, so that benches may be reserved for them.

At the Pharmaceutical Examinations held last month the following students of this College were successful:—

MINOR.

Mr. T. BUXTON.....Belper.
„ W. E. CRASSWELLER.....Bury St. Edmunds.
„ F. DEIGHTON.....Bradford.
„ J. C. B. DUNCAN.....Sevenoaks.
„ G. R. ELLISON.....Whitby.
„ W. H. FITZHUGH.....Bedford.
„ E. O. JONES.....Swansea.
„ E. H. JUDGE.....Newark.
„ W. F. LIVESEY.....Preston.
„ I. T. LLOYD.....London.
„ T. MARRATT.....Great Gonerby.
„ R. J. MARSHALLSAY.....Wareham.
„ F. A. MONK.....Alton.
„ H. W. G. MORRIS.....Charlburg.
„ A. H. NORMAN.....Ely.
„ G. PHILLIPS.....Dowlais.
„ H. A. PIMM.....Torquay.
„ H. SARA.....Falmouth.
„ J. H. SMITH.....Coventry.
„ T. TOPHAM.....Mirfield.
„ P. TUCKER.....Exeter.
„ W. WORSLEY.....Wigan.

PRELIMINARY.

Mr. T. J. GREEN.....Coggeshall.
„ L. PEACOCK.....Uxbridge.

NOTICE TO PRELIMINARY STUDENTS.

The Examination questions set at the Pharmaceutical Preliminary Examination on October 14th, 1884, *with Answers*, will be sent on receipt of 6½*d.*, post free.

For Prospectuses and other information, apply to

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TRINITY SQUARE, BOROUGH, LONDON, S.E.

MR. JUDD'S CLASSES

December & February Minor

The Morning Class daily, 10 to 1 a.m. Students can enter at any time, and for any period.

The Evening Classes, 7.30 to 10 p.m.

On Monday and **Thursday** are for the December and February exams. Students can enter for Monday or Thursday, or for both, as each class follows a separate course.

On Wednesday and **Friday** are for new comers and less advanced students. Each beginner receives special instruction before commencing in the Chemistry classes.

All subjects are taught. Students succeed at every examination.

The January Preliminary.

The class is held every Tuesday at 7 p.m.
For terms, &c., call or write, with stamp, to

Mr. H. JUDD,

West Central School of Pharmacy, 31, Regent Square, W.C.

ENGAGEMENTS WANTED.

AS DISPENSER. 6 years' experience. Keep books also, &c., if required. Passed Final examination of Pharmaceutical Society, London, also Assistant's qualification of Apothecaries' Society. WM. WORSLEY, Worsley Ter., Standishgate, Wigan.

AS JUNIOR. Wholesale or Retail. Age 21. Height 5ft. 7in. 6½ years' experience. W. G., 9, Willow Row, Horncastle.

BY the middle of December.—As ASSISTANT. Minor qualification. Age 23. CHAS. BULLOCK, 63, St. George's Rd., Southwark, S.E.

AS MANAGER preferred. Town or country. In or out-door. Minor qualification. Age 29. Single. CHEMIST AND DRUGGIST, City News Rooms, Ludgate Circus, London, E.C.

AS MANAGER. 20 years' practical experience (Homœopathy combined). Can Prescribe and Extract Teeth. At liberty December 1st. Age 35 years. Height 5ft. 10in. Married. MINOR, 42, Mount St., Southport.

AS MANAGER or ASSISTANT, or to take charge of Surgeon's Retail. Well up in Dispensing, Prescribing, and general routine. Age 28. CHEMIST, 33, Beak St., Regent St., W.

AS JUNIOR. Ætat. 21. 5 years' experience in good class Dispensing and Retail. Height 5ft. 11in. Disengaged. F. W. WHITE, Church St., Launceston.

OUT-DOORS, or to Manage. Age 30. Married Good Dispenser and Prescriber. Can Extract Teeth. 16 years' London and country experience. Good references. CHEMICUS, 2, Cheltenham Villas, Weston-super-Mare.

AS ASSISTANT. Qualified. 13 years' experience in first-class Retail and Dispensing establishments. Good references. Disengaged. Eastern counties preferred. A. W. HEAVER, 164, Dereham Rd., Norwich.

AS JUNIOR or IMPROVER in a good Prescribing and Dispensing business. 3½ years' experience. Country preferred. E. O. A., 44, Bank Ter., Welshpool.

AS ASSISTANT (London or any large town). 21 years of age. 5ft. 9in. high, and has had 7 years' experience in good class Dispensing. H. E. SLINN, 136, High St., Stourbridge.

AS ASSISTANT. Age 26. In town or country. Good Prescriber and Salesman. Has had the Management of a business during illness. Disengaged. DELTA, 41, Silver St., Salisbury.

ENGAGEMENTS WANTED.

AS ASSISTANT, in Dispensing and light Retail. Good experience. Age 22. R. D., 3, Mornington Ter., Wanstead, E.

AS TRAVELLER, with a view to Partnership, in a firm of Wholesale Druggists, by a gentleman who can introduce business; or would make an arrangement with a Retail Druggist with suitable premises, wishful of making a Wholesale. L. D. 315, Messrs. Deacons, Leadenhall St., E.C.

AS ASSISTANT, in good Dispensing business, in London. Out-door. Engagement part time preferred. Age 25. Height 5ft. 11in. OMEGA, 43, Trinity Sq., S.E.

AS ASSISTANT. Good class Retail and Dispensing. Age 21. Height 5ft. 11in. State particulars and salary, to P. REYNOLDS, 16, Wide Bargate, Boston, Lincolnshire.

WHOLESALE.—Advertiser seeks a position of trust with Wholesale Drug firm. 5 years with Wholesale Druggists; 2 with Chemical Manufacturer. Excellent business qualifications. Thorough knowledge of Chemistry. No objection to travel. Age 24. Highest references. CHEMIA, Mr. J. Kirkham, Newsagent, Rochdale Rd., Manchester.

AS ASSISTANT. Aged 22. Height 5ft. 10in. 6 years experience. First-class references. City or West-end preferred. Free at Christmas. W. 69, Mrs. Oswin, Norfolk St., Coventry.

AS ASSISTANT. South Coast or London. Good experience and references. Age 24. Out-door preferred. Abstainer. S. A. G., J. Bell & Co., Pharmaceutists, Hastings.

AS JUNIOR in a good Dispensing business in London, with time for study. Age 22. Height 5ft. 9in. 7 years' experience. INGLUVIN, 6, North Rd., Highgate, N.

A MEDICAL man, of good address, age 40, many years in active practice, who cannot undertake night work, seeks an appointment with a Chemist and Druggist as PRESCRIBER and DISPENSER. H. H., Miss Harman, Silwood St., Brighton.

AS MANAGER or Senior ASSISTANT. Out-door. Eastern Counties preferred. Major. Good experience. Or as LOCUM TENENS, in London. State salary, &c., to M. P. S., 29, Walsingham Rd., Upper Clapton, N.E.

AS JUNIOR, in-doors, having just served 5 years' apprenticeship. Been accustomed to good class Family and Dispensing business. State salary, &c., T. W. P., 57, Upgate, Louth.

ASSISTANT, in or near West-end, where 2 or more are kept preferred. Age 23. Height 5ft. 10in. J. M. M., 180, Barnsbury Rd., N.

LOCUM TENENS.—Mr. W. B. WEST, Staines Rd., Hounslow. Over 30 years' town and country experience, and unexceptionable references. Terms moderate. Disengaged 15th.

ASSISTANT to Chemist or DISPENSER to Surgeon in London. First-rate experience in high class business. Age 22. Excellent references. E. HILL, Edwin Nuthall, Bank Plain, Norwich.

AS Managing ASSISTANT, or for Branch. Age 38. Single. Competent Prescriber and Dispenser. Qualified. Permanency desired. Unexceptional references. CHEMIST, Mr. Long, Sutton Parva, Warminster.

AS JUNIOR. Age 19. In a good class Retail business in London. Time for study in lieu of salary. F. W. T. FERGUSON, Woodbine House, Cosheston, Pembroke.

AS SENIOR or MANAGER in good class provincial business. Midlands preferred. First-class town experience. Major qualification. Age 28. Height 5ft. 8in. G. HUMPHREYS, Bridge St., Corwen.

ENGAGEMENTS WANTED.

AS Assistant or Dispenser, in a good pharmacy (town preferred). Age 24. 7 years' good and varied experience. Satisfactory references and testimonial. Chemicus, Prospect Cottage, Lobster Rd., Coatham, Redcar.

OUT-DOOR. Age 27. Height 5ft. 10in. Minor qualification. Good references. Would not object to Management of village Branch. Permanency. J. W., Mr. C. Heaver, Lower Colwell, Haywards Heath.

PARTIAL employment (from 10 to 5). As Junior. Out-doors. West-end preferred. Age 19½. Alleyn, May's, 159, Piccadilly.

AS Assistant, or Manager of Branch. Married. 20 years' experience. No examination qualification. Chemicus, 18, Mowbray St., Nottingham.

EVENING employment. A competent Dispenser, from leading Hospital, seeks engagement in or near London, for one or two evenings weekly. Experienced in the Retail. X., 14, Romilly Rd., Finsbury Park.

IN the South. London preferred. Age 23. Abstainer. Reference, present employer. First-class Dispensing experience. State staff and hours, Frank Hebron, Wellswood Pharmacy, Torquay.

AS Manager, or out-door Assistant. Married. Age 32. Good Prescriber and Counterman. West-end experience. Permanency desired. Speaks French and German. Chemist, 24, Moreton Pl., Belgrave Rd.

AS Managing Assistant, or for Branch. Married. 23 years' experience. Good Counterman. Accustomed to good Family and general trade. Good Accountant. No objection to travel. Burton, Boyer St., Derby.

AS Assistant. London preferred. Time for private concern (not Chemists), required occasionally by mutual arrangement. Good experience. Age 27. Height 5ft. 8in. W. Seedhouse, 2, Osnaburgh St., N.W.

IMMEDIATELY.—Junior. In light Retail and Dispensing business. 7½ years good experience. Height 5ft. 8½in. Age 22. Good references. Medicus, 16, Lincoln Ter., Welbeck St., Mansfield.

BY advertiser. Age 24. Where time would be given for attending classes. Salary no object. Disengaged. Alpha, 54, Rotherfield St., Islington, N.

AS Junior in Retail and Dispensing. London preferred. Age 21. Over 5 years' experience. State salary, and usual particulars to, Perseverando., 20, Chalcot Cres., Primrose Hill, London, N.W.

ASSISTANTS WANTED.

AN experienced Assistant for India.—A steady, honest, single young man, from 24 to 28 years of age. A good salesman. Quick and smart, generally. A Scotchman preferred. Address, India, Horncastles, 61, Cheapside.

BY 30th November, a trustworthy energetic Junior Assistant for a good mixed Retail Drug and Agricultural business in Cambridgeshire. Hours light. A comfortable home and time for study. Good reference indispensable. Apply by letter, W. B., Messrs. Hodgkinson & Co., Upper Whitecross St., London, E.C.

IMMEDIATELY, a quick and accurate Dispensing Assistant (who must possess the Major qualification), in a first-class business in an inland watering place. Three Assistants kept. Apply, stating age, height, references, &c., and enclosing carte (to be returned), to E. H. Metcalfe, Pharmaceutical Chemist, Malvern.

EARLY in February.—An Assistant, in a good Dispensing and Retail business, in suburb of London. One desiring a permanency preferred. Apply, by letter only, stating full particulars to W. P. H., Messrs. F. Newbery & Sons, 1, King Edward St., E.C.

ASSISTANTS WANTED.

SUSSEX County Hospital, Brighton, 12th November, 1884.—Dispenser wanted. Written applications for the office, with testimonials as to character and qualifications, addressed to the undersigned at the Hospital, will be received by the Committee of Management on or before 11 o'clock a.m., on Wednesday, the 3rd day of December next. Candidates must be duly qualified Pharmaceutical Chemists, and will have to pass a vivâ voce examination of a practical nature. Salary £100 per annum, rising at the discretion of the Committee of Management to £120 per annum, and a meat luncheon, with beer, will be provided daily at 1 p.m. The Dispenser resides out of the Hospital, and is forbidden to make any engagements that may interfere with the interests of the Hospital. The person elected will have to join on or about the 10th December next. By order of the Committee of Management.
E. F. Bourchier, Lieut.-General, *Secretary.*

IMMEDIATELY.—An experienced Assistant for a good class Mixed business. Must be neat and accurate Dispenser, of good address and willing to make himself generally useful. Apply, stating age, height and usual particulars, to Fowke & Son, Stafford.

IMMEDIATELY.—A Junior, about 20 years of age, for a brisk Retail and Prescribing business. Very little Sunday duty. Must have first-class references. Apply personally, to W. M. Covell, Dispensing Chemist, 302, Mare St., Hackney, London, E.

AN energetic, obliging and gentlemanly Assistant as Junior, for a good country business. Apply, stating particulars, salary required, and if possible, carte, to be returned at once. Corfe, Chemist, Maidstone. Also an Improver.

A COMPETENT Assistant, from 25 to 30 years of age. Qualified by experience. Of strictly sober habits, and seeking a permanency. Address, with particulars of age, height, salary required, and references, J. Westlake, High St., Sutton, Surrey.

IMMEDIATELY. — For China. An experienced Assistant (Scotchman) with the Minor qualification. Address, C., care of Messrs. Paterson & Son, Stationers, Cullum St., E.C.

A GOOD Junior Assistant for a light Retail and Prescribing business. One only kept. Age about 21. 2 hours daily allowed for study. Personal interview necessary before engagement. Apply, stating salary and full particulars, to F. W. Sandy, 390, Walworth Rd., S.E.

AN experienced Man to superintend Laboratory and Manufacturing Department. Good character. Apply, Wm. Fox & Sons, 109 & 111, Bethnal Green Rd., London.

IN 3 weeks.—A Junior Assistant, accustomed to an Agricultural trade. If able to Extract Teeth preferred. Apply, stating age, height, experience, and salary required, to H. C. Webb, Pharmaceutical Chemist, Buckingham. Carte de visite if convenient; to be returned.

RANDALL & SON, Southampton, seek immediately a Junior Assistant, well grounded in Dispensing and general business. Good personal character. In house. State salary required, age, height, previous experience, &c.

ST. LEONARDS.—A gentlemanly Assistant well accustomed to good class Dispensing business. Apply with carte and usual particulars. Barclay, 48, Baker St., W.

A QUALIFIED Assistant. Hours from 8.30 a.m. to 7 p.m. No Sunday duty. Out-door. State age, reference, salary required, &c. Apply by letter, to H. Walley, 6, Hopwood Avenue, Manchester.

IMMEDIATELY.—Resident Assistant. Married; not more than 2 children. Must be thoroughly trustworthy. Apply by letter, stating age, experience, &c. H. C., Messrs. Baiss Bros., 4, Jewry St., E.C.

ASSISTANTS WANTED.

IMPROVER, Apprentice or Turnover, in an old established Dispensing and Family trade, situate in the Midland Counties, where there is every opportunity of thoroughly learning the business, combined with a comfortable home. Address particulars to Pharmaceutical Chemist, care of Messrs. Hodgkinson, Stead & Co., 198, Upper Whitecross St., London, E.C.

APPRENTICE.—A vacancy for a well educated youth. Terms moderate, with comfortable home and good opportunities of thoroughly learning the business. Apply to W. R. Chantler, Newport Pagnell, Bucks.

APPRENTICE.—A vacancy exists in an old established Family and Dispensing business. Neighbourhood healthy and pleasant. Every opportunity of thoroughly learning business. Time allowed for study and recreation. Premium required (which will be returned as salary). One having passed Preliminary preferred. Walker, care of Evans, Sons & Co., Liverpool.

APPRENTICE.—A well educated youth, for a good class Mixed country business. Time for study. Comfortable home. Small premium. G. T. Botterill, Pharmaceutical Chemist, Great Grimsby.

APPRENTICE.—In light Retail and Dispensing business. Every opportunity given for acquiring a good knowledge of the business. Exceptional educational advantages offered, viz., 2 hours every day for study; lectures and laboratory instruction 2 nights a week; also, a 3 months daily course at a recognised School of Pharmacy. Late Apprentice gained the Bell Scholarship this year. Moderate premium. For full particulars apply to E. Howard, Chymist, 184, Old Kent Rd., London, S.E.

APPRENTICE.—A vacancy for a well educated youth (one who has passed the Preliminary preferred) occurs in an old established pharmacy. Time for study and recreation. Highest references given and satisfactory ones required. Apply to C. R., Messrs. Barron, Harveys & Co., Giltspur St., London, E.C.

AS Improver, or one who requires time for study for Minor. All books specimens, and help found. Apply by letter, to Mr. Heath, Chemist, St. Mary Cray, Kent.

AN Assistant, with Minor qualification, who has been accustomed to good class Retail and Dispensing. Send full particulars, with carte, to Geo. Goodliffe, Pharm. Chemist, Folkestone.

FOR West-end Pharmacy, by end of November.—A thoroughly reliable Dispenser and good Counterman. Duties light. Domestic arrangements unexceptionable. Apply, stating age, height, salary required, giving references, accompanied by carte, to be returned, to X. X., Herrings & Co., 40, Aldersgate St., E.C.

A THOROUGHLY trustworthy competent out-door Assistant. Principal duty Dispensing. Must be quick and accurate. Apply, giving full reference, stating salary required, and enclosing carte de visite, to Goulds, Cork.

BY the 28th inst.—An Assistant, for light Retail and Hospital Dispensing. Minor qualification essential. Apply, stating age, height, experience, reference, and salary required, to F. Wheeler, Chemist, Guildford.

A JUNIOR Assistant, for a Dispensing and light Retail business. Apply, with photo., stating age, height, salary required, when disengaged, reference, &c., to F. Sussum, 6, Market Pl., Cambridge. Churchman preferred.

A JUNIOR Assistant or Improver, of good appearance and address, for first-class Retail and Dispensing business. Apply, stating particulars, viz., age, height, salary required, and references, to George Baxter, Pharmacist, Chester.

ASSISTANTS WANTED.

BY December 3rd.—A qualified Assistant, to take charge of a business. Good salary given to a suitable person. Preference given to a total abstainer. Apply, with full particulars, as to reference, age, &c., to Chemicus, Ferndale, Pontypridd.

A COMPETENT Assistant, for a good class Dispensing and Retail business. Apply, stating age, height, references, and salary required, to G. T. Green, Chemist, Godalming, Surrey.

LABORATORY Man, Manufacturer of Pharmaceutical Preparations, &c.—Good references as to competency essential. Apply to W. W. Flood & Co., 102 & 103, Blackman St., Southwark.

A CHEMIST in a leading thoroughfare in London requires an Improver. As it is an out-door situation, one who has friends with whom he could reside would be preferred. A Junior Assistant also wanted. Apply personally or by letter addressed, H. R., care of Messrs. Barron & Squire, Bush Lane, Cannon St., London E.C.

A COMPETENT Assistant, not under 23 years of age, of good address and experience. Must have good references. One with Minor qualification, and desiring a permanency preferred. Apply personally, if possible, to W. Bower, 96, Tottenham Court Rd., London, W.

BUSINESSES FOR DISPOSAL.

IN the centre of the City of Lincoln, opposite the Chief Post Office, in Guildhall Street, an old established Retail Chemist and Druggist's Business. For terms and particulars apply to Mr. Alfred Walton, 15, Whitecross St., Cripplegate, London, E.C.; or Mr. W. T. Page, Jun., Solicitor, Lincoln.

SOUTH Wales.—An old established genuine Drug Business, with immediate possession. Through death. Fair receipts. Shop well fitted (mahogany). Good house and garden. A rare opportunity for anyone wanting a business in a good agricultural district. For further particulars apply to W. E., Victoria Pl., Crickhowell.

A GOOD Retail and Prescribing Business, with good sale of Proprietaries. Good shop and house, situate in the centre of Hull, in the best thoroughfare. A good opening for energetic man with moderate capital. Ingoing by valuation, about £500. Address, for further particulars, James Stocks, Valuer, 52, Savile St., Hull.

IMMEDIATELY.—An old established Business, in the West End, owing to the ill-health of the proprietor. A sacrifice would be made to a prompt purchaser. Address, G. D., care of Messrs. Barron, Harveys & Co., Giltspur St., E.C.

MIDLANDS.—Shop, handsomely fitted, double-fronted, heavily stocked, well established, and good dwelling house. To be sold very much below value. Southern County. Rare chance. Through illness. Returns £1000, at full prices. Rent only £40. Handsomely fitted. First fair offer accepted. Near London. Doing £25 weekly and increasing steadily. Price £1100. Apply, Hine Gilbert & Co., 17, Hart St., Bloomsbury.

IMMEDIATELY.—An old established Business, situate in the main street. Ingoing very moderate. Rent £25. For particulars apply to G. C. Allen, Auctioneer, &c., Deal.

LONDON, N.—Old established Retail, Dispensing and Prescribing Business. Capable of great extension. Good house, held on lease. Private entrance. Rent low. Returns over £500. Price £400. Part can remain if so arranged. Address, Omega, care of Chemist, Grove Rd. near Tollington Park, N.

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MESSRS. GURDEN BERDOE have for transfer:—BANKS OF THAMES. Retail and Dispensing trade. Same hands 30 years. Returns £500. Good house and garden. £450, or offer. OXFORDSHIRE. Unopposed Retail and Agricultural trade. Returns over £1000. Good house and garden. Low rent. For £950, or offer. BERKS. Retail and Dispensing. The leading trade in good market. Returns £1000. Stock and fixtures worth £750. For £1000, or offer. Good house and garden. WILTS. Old established trade. Returning £850. For £550. Through illness. LONDON, S.W. Elegantly fitted corner Retail and Dispensing trade. Returns £1150. Net profit over £500. For £1150. N.W. Main road. Well fitted Retail and Dispensing trade. Returns £550. For £450. Half can remain. E. Retail and Prescribing trade. Returns £500. For £250. N. Well fitted Retail. Returning £4 weekly. Neglected. For £85. W. Returns £4. For £71. Please apply, 30, Jewry St., Aldgate, City.

SOUTH.—A genuine and profitable light Retail, Dispensing and Prescribing BUSINESS. Modern fittings. Corner shop, in main street. Returns £400; increasing. A good opportunity for a beginner. Rent low. Can be let off. Address, F. W., care of Messrs. Edwards & Son, 157, Queen Victoria St., London.

NEAR London, N.—By Executors. An old established Retail and Prescribing BUSINESS, in a good market town within 12 miles of London. Splendid position. Very large shop, well fitted. Good house. Most desirable residential neighbourhood. No opposition. For further particulars address CHEMIST, 85, Gracechurch St., E.C.

CHEMISTS.—To an enterprising man a rare opportunity presents itself for acquiring a thoroughly genuine and increasing BUSINESS in good corner position in main thoroughfare of a large seaport town. Must be sold. Lease may be obtained. Ingoing for stock and fixtures about £250. Apply to CHEMIST, care of Hearon, Squire & Francis, 5, Coleman St., E.C.

KENSINGTON.—Thoroughly genuine first-class Dispensing and Retail BUSINESS. High class neighbourhood; very rapidly increasing. No opposition. Full prices. Good opening for Dentistry. Good house, well let off. Lease 14 years. Every investigation to bonâ fide purchasers. Incoming £700. Terms cash. No agent need apply. CHEMICUS, 27, Earl's Court Rd., W.

£650 cash will purchase first-class Retail and Dispensing TRADE. Select suburb of London. Returns £800. Elegantly fitted. Well stocked. Long lease. Very profitable business. Almost unopposed. Taking larger trade cause. Same hands many years. Apply, VERITAS, 29, Oakfield Rd., Tollington Park, N.

COMMISSION.

TRAVELLERS calling upon Chemists can hear of a good commission in following districts:—Ireland, Scotland and Wales, Lanc., Yorks, and North, also West beyond Bristol. LIEBIG, "Chemist and Druggist" Office, 42, Cannon Street, E.C.

FOR SALE.

ONE 4ft. nest of mahogany fronted Drawers, 20 drawers in number, with glass knobs and gold labels, £2; 5ft. ditto, £2 12s.; 6ft., £3; 8ft., £4; 12ft., with 60 drawers, £6; 6ft. Spanish mahogany Dispensing Screen, very handsome, £7 10s.; a 4ft. upright Case, as A 54, £3; a 5ft. mahogany Wall Fitting, as A 85, £6 10s.; a 4ft. Wall Case, as A 87, £4; Writing Desk and Case, as A 32, £3; 6ft. plate-glass Case, as A 18, £6; plate-glass Tooth Brush Case, £1 10s.; a very handsome Spanish mahogany plate-glass Wall Case, 6ft. long, as fig. A 88, £20; and a quantity of Cornicing, Pilaster and Shelving, all very cheap. BYGRAVE, 12, Curzon St., Wenlock St., New North Rd., Hoxton, London, N.

E. NATALI, Shop Fitter, 207, Old Street, E.C., begs to inform Chemists, &c., that he is prepared to Fit Shops in town or country at very reduced rates, on the deferred payment principle.

FOR SALE.

Glass Counter Cases, bent plate-glass, 2ft. long, 30s.; 2ft. 6in. long, 35s.; 3ft. long, 60s.; 3ft. 6in. long, 70s.; 4ft. long, 75s.; 5ft. long, A 18, £5; 6ft. long, A 18, £6; 8ft. long, £8; 3ft. long, A 4, 80s.; Tooth Brush Cases, bent plate, A 10, to open at back, 30s.; ditto, revolving front, 55s.; A 9, 30s.; plate-glass Cases, A 2, 3ft., 35s.; 3ft. 6in., 40s.; 4ft., 50s.; 5ft., 60s.

Wall Cases, 12ft. long, £6 10s.; 10ft. long, 9ft. high, £20; 8ft. long, 9ft. high, A 88, £27; 11ft. long, £7; 10ft. Wall Case, with nest 20 mahogany drawers under, £10.

Fixtures, Drawers, Shelving, with cornice over, A 84, 6ft. long, £6; 8ft. long, £8; 10ft. long, £10; 12ft. long, £12; also as A 82, 12ft. long, with cupboards, drawers, shelving, &c., £9.

Counters, painted fronts, mahogany tops, 5ft., 6ft., 8ft., 10ft., 12ft., 14ft.; ditto, with polished oak fronts, 7ft., 10ft., 14ft.; Counters, with mahogany polished fronts, 9ft. long, 12ft. long, 18ft. long; Counters, with mahogany and plate-glass cases in front, 4ft., 6ft., 9ft., 12ft., 14ft.

Dispensing Screens, 5ft., 6ft., 7ft. 6in., as fig. A 55; 3ft., 3ft. 6in., 4ft., as A 54; Dispensing Screens, any size, glass case at each side, silvered plate-glass centre, with marble slab in front, very elaborate, £7.

Desks, with cases in front, 40s., 50s., 60s., with silvered glass back, inside case, 65s.

Sponge Cases, A 41, 60s.; A 43, 95s.; Show Stands, A 37, 55s.; as fig. 5, 50s.; fig. 6, 60s.

Specie Jars, with gold covers, 27in. high, royal arms, &c., 80s. pair; a quantity of blue and white Ointment Jars, labelled, 18s. doz.; Mortars (new), Funnels (new), Pill Machines (new), to cut 24, 16s.; Black Stock Bottles (new), labelled any names, 15s. doz.; 4 10-gall. Carboys, with stands, 21s. each; Reversible Pill Machine, 3 and 5 gr., marble slab, 25s.; Royal Arms, splendid condition, for outside shop, 45s.

E. NATALI, 207, Old Street, near Pitfield Street, London.

TO CHEMISTS FITTING UP OR MAKING ALTERATIONS.

ONE 12ft. range of new mahogany-fronted Drawers with glass labels and knobs, and lockers under, shelving and cornice over, price £14; return shelving and cornice, 12ft. or 14ft. long, 42s.; 9ft. Counter, with panelled front, 60s.; 6ft. ditto, with Spanish mahogany top, 45s.; one Dispensing Screen, with mirror centre, 5ft. long, 110s.; one ditto, 6ft. long, 120s.; one ditto, 7ft. long, with handsome tablet in centre, £7; one ditto, 6ft. long, with Gothic mirror centre, £7 10s.; one 6ft., one 12ft. and one 18ft. range of best make pine-fronted Drawers, stained mahogany and French polished, gold labels and glass knobs, 66s., 132s. and 198s.; lot of 250 Show Globes, from 1 gallon to 12 ditto; 100 new 20 oz. W. and N. mouth Rounds, newly labelled, price 90s.; 50 ditto 40 oz., 63s.; 72 8 oz. ditto, 54s.; 100 3 lb. new blue Ointment Jars, newly labelled, 24s. per doz.; range 67 second-hand Drawers, newly painted mahogany, with gold labels and glass knobs, £5; 20 6 lb. white Ointment Jars, 1s. each; second-hand Tinct. Presses, various; plate glass Tablets for fixing on outside of shop windows; good second-hand Globe Lamp, with handsome bracket complete. Further particulars and illustrated price lists free on application to R. TOMLINSON, Midland Medical Fitting Warehouse, 15, St. Paul's Square, Birmingham.

STOCK & FIXTURES FOR DISPOSAL.

DRAWERS, Bottles, Carboys, Lamp, Utensils-in-Trade, &c., sufficient to fit out a shop complete. LINDEN, Broughton, Winchester.

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VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

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MIDLANDS.—Dispensing and light RETAIL, returns £800 price £500.

LONDON, N.—Dispensing and light RETAIL, returns £550 price £400.

DURHAM CO.—Returns £875, price £400.

SOUTH COAST.—DISPENSING, &c., returns £500, price about £450.

LONDON, S.W.—Returns £260, sure to increase, price £200, including valuable lease.

LONDON, N.W.—BRANCH, returns £520, price £500, or valuation.

LEICESTERSHIRE. — Returns £1270, new Prescriptions 2000 per annum, price £500.

NORTHAMPTONSHIRE.—Village RETAIL, returns £500, price £350.

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CHEMISTS' TRANSFER and ASSISTANTS' REGISTRATION AGENCY,

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Purchasers applying for businesses should specify locality preferred and capital to be invested.

Many excellent businesses on the Register.

No charge to purchasers or inquirers.
No charge to vendors unless a sale is effected.

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An Employer writes: "*Mr. ——— wishes to thank you for your prompt attention to his application.*"

An Assistant writes: "*The situation seems to be quite suitable to me, and I feel much indebted to you.*"

Employers and Assistants should send full particulars of requirements, with Registration Fee, 2/6, *Postal Order.*

SEASONABLE Novelties!—RESPIRATORS ON CARDS. The attention of the trade is respectfully called to my Silver-plated and Cotton Wool Respirators. Effectively got up on cards! Their smallness and neatness commends them in preference to any others. Send for sample, post free, 2/-, or a card 5/6. Traveller wanted. A. E. SMITH, 18, Laura Place, Southampton.

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MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

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N.B.—No Charge to Purchasers.

MESSRS. ORRIDGE & CO. are instructed to transfer :—

1. LONDON, W.C.—Vendor retiring. Retail and DISPENSING, of good class. Returns nearly £550. Good house and shop. Price about £400. Part can remain.
2. LONDON, W.—In a pretty locality. Good class Retail and DISPENSING. Held by vendor many years. Double-fronted, corner position. Returns nearly £500; can be much increased. Good house; low rental. Easily let off if wished. Price about £400.
3. LONDON, N.W.—Small nucleus of BUSINESS, situated in a thickly populated locality. Returns at present £5 per week; can easily be increased. Good house; small garden. Price £150.
4. HOME COUNTIES.—Pretty locality. Good class Retail and DISPENSING. Returns over £700. Large, handsome, double-fronted shop; very attractive. Good house; low rental. Price about £700. This business can be highly recommended. Bonâ fide reasons for sale.
5. PLYMOUTH.—Light Retail and DISPENSING. Returns nearly £500; can easily be increased. Large double-fronted shop. Good house and small garden. Price £300.
6. NORTH OF ENGLAND.—Very old select Dispensing and Retail BUSINESS, with Mineral Water trade attached. Returns nearly £4000. Net profits about £1300 yearly. Large house, vendor's own, well situated. This is a genuine concern and well suited for partnership. Vendor will give twelve months' personal introduction. Terms to be arranged equitably.
7. SOUTH COAST.—In a pretty country town. Good class Retail and DISPENSING. Returns £500 yearly. Large double-fronted shop. Good house and large garden, well stocked with fruit trees, flowers, &c. Open to the fullest investigation. Price £450.

Other businesses, town and country. Particulars free on application.

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Terms for valuation on application.

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Fig. 13.

Fig. 8.

MAW'S IMPROVED.

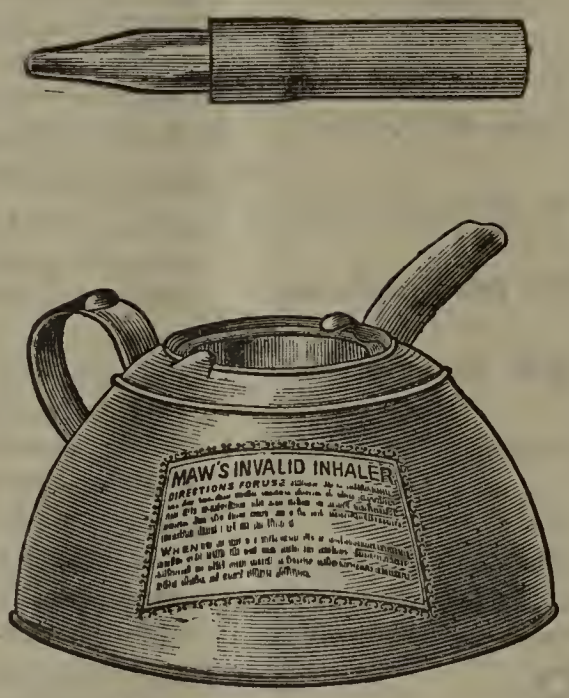

Fig. 100.

MAW'S INVALID.

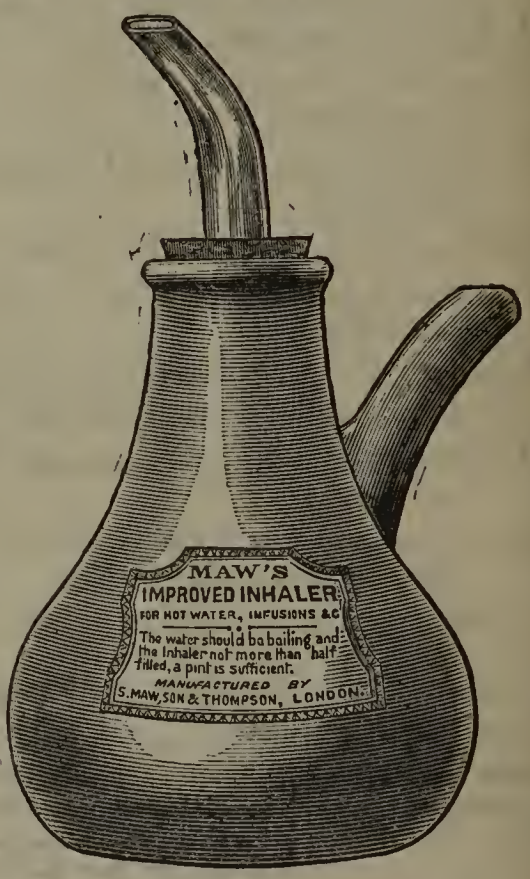

Fig. 8a.

MAW'S IMPROVED.

Fig. 8:—Marbled, 32s. per dozen.

Fig. 100:—White, 33s.; Gilt Lines, 39s. per doz.

This Pattern is specially adapted for use in bed.

Fig. 8a:—White, 21s. per doz.; Retail, 2s. 6d. each.

ELASTIC TUBES, as Fig. 13, will fit any of the above.

7 inches long, including Mouth-pieces ... ... 8s. per dozen.

9 inches long, including Mouth-pieces ... ... 12s. per dozen.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 752.] SATURDAY, NOVEMBER 22, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
The New Alkaloids of Cuprea Bark. By B. H. Paul and A. J. Cownley ..	401
Sanitation. By T. Williams.....	403
Modern Complexions and Cosmetics..	405
Tengkawang Fat, or Vegetable Tallow.	407
Quassin and its Constitution. By V. Olivieri and A. Denaro	409
The Harvesting of Cinchona Bark	410
EDITORIAL ARTICLES AND NOTES:—	
The Constitution of Uric Acid	411
Notes:—Conversazione of the Chemists' Assistants' Association — Poisoning by Gelseminm — The Oxygenation of Drinking Water—Cochineal Experiment in Madras —Percolator Literature—Essential Oils from Ceylon	412
PROVINCIAL TRANSACTIONS:—	
Sheffield Pharmaceutical and Chemical Society	413
Liverpool Chemists' Association:— Guaiaeum Resin. By J. S. Ward..	413
Oldham Chemists' Assistants and Apprentices' Association.....	415
Halifax Chemists' Association	416
PROCEEDINGS OF SCIENTIFIC SOCIETIES:—	
School of Pharmacy Students' Association	416
Chemists' Assistants' Association:— The Chemistry of Digestion. By W. J. Frankish, M. R. C. S., L.R.C.P.	417
REVIEW:—	
Meetkerke's 'Medicine Stamp Tax'.	420
Answers to Correspondents	420

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, December 3rd, 1884, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at half-past 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 26th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 5th day of December next, at 12 o'clock precisely.

By order of the Council,

RICHARD BREMRIDGE,
Secretary and Registrar.

October 1st, 1884.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

For list of approved Candidates see next page.

There are at present *thirty-nine* annuitants, receiving £1320 per annum, and casual relief is also granted, amounting to nearly £700 per annum, involving a total annual expenditure of upwards of £2000.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and

£35 per annum to pensioners 65 years of age and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of Half-a-crown are entitled at each election of Annuitants to	ONE Vote.
Five Shillings	TWO Votes.
Half-a-guinea	FIVE Votes
One Guinea..	TEN Votes.
And to increase in the same proportion.	
Five Guineas are entitled to	FIVE Votes for life.
Ten Guineas	TEN Votes for life.
And to increase in the same proportion.	

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

BENEVOLENT FUND.

APPROVED CANDIDATES.

1.—Braithwaite, Annie Elizabeth. Age 51. Twickenham. Widow of an Annuitant, who was formerly an Associate of the Society, and for thirteen years an Assistant in the Society's Laboratory, and subsequently for sixteen years a teacher of chemistry. Applicant is endeavouring to make a living by letting apartments.

2.—Cooke, John. Age 64. London. A Member of the Society from 1353 to 1877, and subscriber to the Benevolent Fund from 1865 to 1878. Applicant carried on business in London for thirty-six years, but failed through ill-health. He is, from the same cause, quite incapacitated from earning anything. *Second application.*

3.—Davies, Caroline C. Age 56. London. Widow of an Annuitant, who was a Member of the Society from 1842 to 1870, and a subscriber to the Benevolent Fund for twenty-six years. Applicant is in delicate health, suffering from internal disease, and dependent upon her children, who are barely able to maintain themselves.

4.—Davis, Francis. Age 77. Hereford. A Member of the Society and Local Secretary for Leominster from 1841 to 1858. Applicant was in business on his own account at Leominster for twenty-seven years, and retired about twenty-five years ago, but was unfortunate in his investments and lost all his money. His wife, age 60, has about £40 per annum. Applicant's age precludes his obtaining employment.

5.—Fowler, Sarah Anne. Age 64. London. Widow of a registered Chemist and Druggist before August 1st, 1868, who carried on business in London for several years. In 1872 he met with a railway accident (from which he suffered for a period of nine years before his death in a lunatic asylum) but failed to get compensation from the Company. Applicant has partially lost the use of her right hand by accidental poisoning, necessitating the amputation of her fore-finger. She is in very delicate health and is dependent for support upon the charity of friends. *Second application.*

6.—Glynn, Elizabeth Pearse. Age 63. Torquay. Widow of a Member of the Society from 1846 to 1878, when, after an illness of ten years, he died, leaving no provision for his family. He was in business on his own account at Torquay for thirty-three years. Applicant, whose sight is very imperfect, has two daughters, who assist her in letting apartments. Her only son is incapable of work owing to mental weakness, and is dependent upon her for support.

7.—Goadsby, Elizabeth. Age 65. Salford. Widow of a registered Chemist and Druggist before August 1st, 1868, who died in April, 1882. Applicant is quite unable from excessive weakness to do anything to earn her own living. A lady allows her £12 a year, but she has no other means of subsistence.

8.—Johnson, George Thomas Fortin. Age 74. St. Leonard's. A registered Chemist and Druggist before August 1st, 1868. He was in business on his own account for eight years at Norwich, and at St. Leonard's for thirty-seven years, where he failed in 1868. Applicant is dependent upon the charity of friends, and is incapacitated by age from earning anything towards his maintenance.

9.—Read, Robert Elimelech. Age 66. London. An Associate from 1842 to 1845, and a Member from 1875 to 1881. Applicant was in business at Hadleigh, Suffolk, where he failed in 1878. Since then he has been trying to get a living by driving a cab, but his failing eyesight render it difficult for him to continue to support himself in this way.

10.—Sanders, George Lee. Age 73. Tiverton. A Member of the Society from 1841 to 1851, and for some years a subscriber to the Benevolent Fund. Applicant was in business on his own account at Tiverton for forty years, where, in consequence of his age and inability to attend to it, the business gradually fell off and was eventually sold to pay creditors. Applicant has an income of £12 a year.

11.—Stephenson, Thomas. Age 72. Rothwell. A registered Chemist and Druggist before August 1st, 1868. Applicant was in business on his own account at Rothwell for forty-five years, and in 1881 he became paralysed, and can now only get about with difficulty. He is unable to earn anything and is dependent upon his children, who are married and cannot render him much assistance.

THE SCHOOL OF PHARMACY

OF THE

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CHEMISTRY AND PHARMACY ..... Professor REDWOOD and Mr. DUNSTAN.
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BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratories.

Application for admission to the School, for Prospectuses, or for further information, may be made to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London, W.C.

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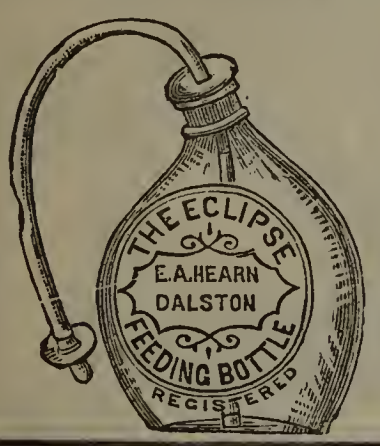

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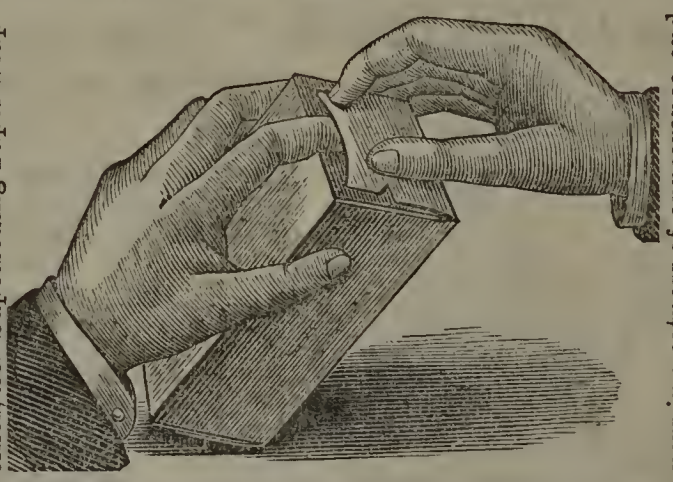

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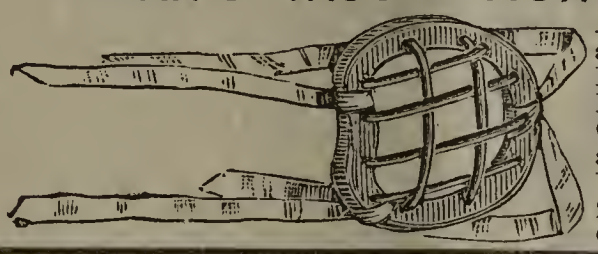

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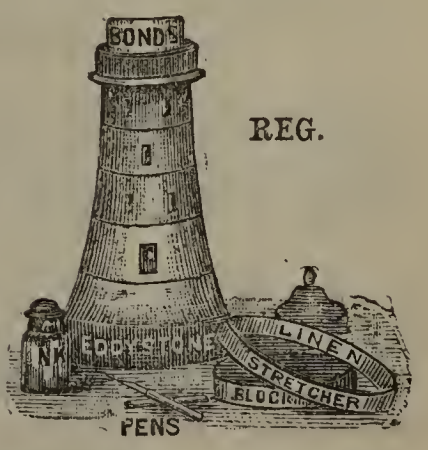

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What the Clergy say of it.

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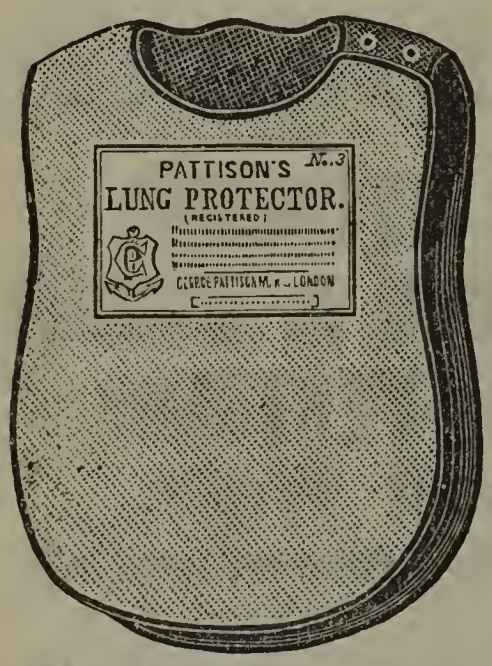

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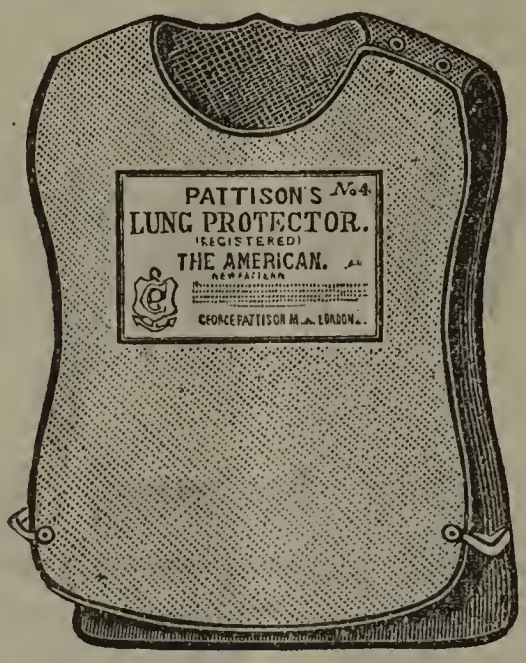

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Cupreine	62·37
Quinine	37·63
	100·00

The method of operating adopted in this case was to precipitate the acid solution of homoquinine with excess of caustic soda solution in the presence of ether, and then to evaporate the ethereal solution in a tared capsule to ascertain the quantity of quinine. The alkaline soda liquor containing the cupreine in solution was repeatedly shaken with ether in order to make sure all the quinine present was removed.

Although there is little precedent for the idea that alkaloids are capable of combining together in such a manner as to yield compounds simulating distinct alkaloids in their chemical characters, we were led by other considerations to try what would be the result from a mixed solution of cupreine and quinine in ether by slow evaporation. Guided by the assumption that the transformation of homoquinine furnished these substances in equal proportions we made a mixed solution of the alkaloids in ether and left it to evaporate. To our surprise the crystals which separated had precisely the appearance of homoquinine, and there seemed some reason to think this substance might really be a compound rather than a distinct alkaloid.

But after the evaporation of the ethereal solution had been carried to such a point that no further formation of crystals seemed probable, and the whole had been allowed to stand in a closed vessel for some days, the remaining ether was drawn off and on evaporation was found to contain unaltered quinine. This result agrees with the one above mentioned in regard to the relative proportion of the two alkaloids, inasmuch as it showed that if homoquinine be a compound of cupreine and quinine the proportion of equal parts leaves a surplus quantity of quinine. Several other experiments furnished results approximating more or less to those obtained by the two methods of analysis and synthesis above described, but without being sufficiently close to decide the question.

In order to test the individuality of homoquinine still further, as regards quinine and cupreine, we prepared a number of different salts of the three alkaloids and compared their characters when deposited by slow evaporation of moderately dilute solutions. The data given in the following tabular form show that there are such marked differences between the salts of cupreine and homoquinine on the one hand, and between those of homoquinine and quinine on the other hand, that it is almost as impossible to regard homoquinine as a compound of cupreine and quinine as it is to regard cupreine and homoquinine otherwise than as distinct alkaloids. For instance, the hydriodate of cupreine is quite distinct from that of homoquinine; the oxalate of cupreine, again, differs quite as much from the corresponding salt of homoquinine; while the amorphous nitrate of homoquinine distinctly differs from that of cupreine as much as it does from that of quinine, the two latter being very similar in their characters, though the corresponding hydriodates are entirely different. We may add that the characters of the homoquinine tartrate may to some extent account for the fact that some observers — Dr. De Vrij amongst the number—have come to the conclusion that cuprea bark contains cinchonidine, though our own experience has led us to the opinion that this is never the case, a point on which we are in accord with Mr. David Howard and Dr. Hesse.

The publication of this paper having been deferred, we have in the interim received from Dr. Hesse a separate copy of a further paper on the subject, of which we think it desirable to append an abstract. It will be seen that Dr. Hesse takes a somewhat different view from that to which we are inclined as to the nature of homoquinine.

Synthesis of Homoquinine.

Under this title Dr. O. Hesse has published a short paper in the current number of the *Annalen der Chemie* in which he refers to the fact already pointed out by him that homoquinine yields quinine when treated with caustic soda solution,* and also to the observation since made by Paul and Cownley, in repeating his experiments, that the production of quinine in this way is only partial and quantitatively represents only about half of the homoquinine operated upon, the remaining portion being a distinct and hitherto unknown alkaloid which remains dissolved in the caustic soda solution, and has been named by Paul and Cownley "cupreine."

Dr. Hesse mentions that in his former experiments with homoquinine he found the simplest way of obtaining quinine by transformation of homoquinine was to shake the warm solution of homoquinine in benzol with some caustic soda solution.† He explains his inference that homoquinine was *completely* convertible into quinine, and consequently to be regarded only as a modification of this alkaloid, by pointing out that in the experiment he describes he found only quinine in the benzol solution after its treatment with soda solution. In the absence of quantitative results this view was natural under the circumstances, and it seemed also consistent with various other characters which homoquinine and quinine possess in common.

In view of the difference between these results Dr. Hesse has since repeated his experiments with homoquinine and has now confirmed the statements published in this Journal‡ by Paul and Cownley.

* *Annalen*, ccxxv., 106, and *Pharm. Journ.*, [3], xv., 148

† In regard to a still unfinished investigation of another alkaloid Dr. Hesse states that he did not on the former occasion mention this experiment. Meanwhile he has shortened the operation with ether by precipitating an acid solution of homoquinine with excess of caustic soda solution, dissolving the precipitate with ether and shaking the separated ethereal solution with some more caustic soda solution.

‡ *Pharm. Journ.*, [3], xv., 221.

In one experiment he determined the amount of quinine produced by the alteration of homoquinine and found it to be 52 per cent., according to which result the amount of cupreine simultaneously formed and taken by difference would be 48 per cent.

Dr. Hesse describes cupreine as crystallizing from ether in small colourless prisms arranged in concentric groups, and as melting at 191° C. It dissolves without fluorescence in dilute sulphuric acid; this solution gives with chlorine and excess of ammonia the green coloration like quinine but not so intense. He finds that cupreine combines with acids and also with bases, the neutral sulphate forming delicate prismatic crystals sparingly soluble in water, and the hydrochlorate having the form of small needles.

Among the compounds of cupreine with bases the sodium salt is described as forming colourless laminæ, presenting a silky lustre. Dr. Hesse regards homoquinine as being a compound of this latter class and as consisting of equal molecules of cupreine and quinine. He states that when cupreine and quinine are dissolved together in excess of dilute sulphuric acid in the proportions already mentioned, the solution then supersaturated with ammonia and shaken with ether, homoquinine crystallizes from the ether solution. This Dr. Hesse considers to be the simplest mode of obtaining absolutely pure homoquinine, and he suggests that since cupreine may be easily prepared from cuprea bark it would probably be most convenient in future to prepare homoquinine synthetically instead of following the plan hitherto adopted.

	CUPREINE.	HOMOQUININE.
Sulphate	Separates in the form of minute milky white specks at the surface of the solution, and when examined with a magnifying glass the specks present the appearance of tufts of radiating acicular crystals. It is very subject to the phenomenon of supersaturation.	Evidently much more soluble than cupreine sulphate; separates in slender needles, sometimes grouped in stellate bunches and presenting characters closely analogous to those of quinine sulphate.
Acid sulphate	Much less soluble than the corresponding salt of homoquinine; the solution on evaporating to a small bulk forming distinct tufts of radiating acicular crystals.	Solution dries up by spontaneous evaporation to a very small bulk, which first becomes syrupy and then solidifies as a gelatinous slightly fluorescent residue of very small bulk comparatively.
Hydrochlorate	Much less soluble than the corresponding salt of homoquinine; distinctly crystallizable, forming bunches of long needles having a glassy lustre.	Solution in drying up leaves an amorphous resinoid residue.
Nitrate	Distinctly crystallizable, though very soluble, and forming from a concentrated solution tufts of long stout needles, radiating from centres.	Solution dries up to a resinous residue, showing no sign of crystallization, even when highly concentrated.
Oxalate	Apparently uncrystallizable, the solution reduced to a very small bulk, eventually drying up to a resinoid residue, with a few crystalline spots.	Much less soluble than the corresponding salt of cupreine, depositing at the surface tufts of delicate needles that become opaque on drying.
Tartrate	Much more soluble than the corresponding salt of homoquinine.	Very sparingly soluble, and in many respects similar to the tartrate of cinchonidine.
Hydriodate	Distinctly crystallizable and sparingly soluble in water without any sign of a resinoid deposit, such as is formed with quinine and homoquinine.	Faintly yellow resinoid mass, separating from solution by slow evaporation in every respect similar to that furnished by quinine salts with potassium iodide.
Fluorescence in acid solution .	None.	Very marked.
Ten per cent. caustic soda solution	Very soluble even in the cold, and without decomposition.	Decomposed into quinine and cupreine.
Strong alcohol	Less soluble than homoquinine; crystallizes very readily in dense warty groups of minute crystals.	Very soluble; solution dries up almost to an amorphous residue before showing any signs of crystals in minute bunches.
Crystallization from Ether .	Crystals more massive than those of homoquinine, arranged in groups and conspicuously striated transversely.	Very thin prismatic laminæ, having characteristically shaped ends with two oblique planes.

SANITATION.*

BY THOMAS WILLIAMS.

The scope of the subject entitled Sanitation possesses a universal and intimate bearing in connection with the existence and well-being of all living things.

The term sanitation may be applied to conditions occurring in nature, or to such circumstances as are brought into existence by mankind.

Sanitation includes a great number of duties ministering to the wants, safety and comfort of the living, and the decent disposal of the dead. Arising from the practice of sanitation we have the branch of knowledge known as sanitary economy and sanitary science.

Necessity compels, owing to the vastness of the subject, that we should limit the communication that I have the honour to bring before you for discussion this evening to one department in sanitation, namely, the air we breathe.

We are aware that there is an enormous supply of air around us, approximately there is 15 lbs. weight of air on every square inch of the earth's surface; it is also known that it is the principal article consumed as regards quantity by the animal economy. It is, therefore, of vital importance that we should have a pure atmosphere, as under such conditions we should be practically sure of the purity and wholesomeness of all other requisites, the preservation and storage of water and foods would be easy, and the maintenance of health simple. Scientific chemists have pointed out that in the main the natural component parts of common air are three substances, namely, oxygen gas, nitrogen gas and water vapour. It is known that there are some localities on the earth's surface where the air is so impure that it cannot be breathed, and in some mines, manufactories, etc., without ventilation, and a large admixture of common air, workpeople could not exist, and the health of the individual is ruined even in breathing the mixture. In towns, again, ordinary air is unknown, and as a result of the degree of its pollution thousands of lives are injured and lost annually. It is almost impossible to ventilate the narrow alleys and courts of our large cities, as, unfortunately, the air in the street is no fresher than that inside the house. It needs little observation to discern the sources, and, to some extent, form an estimate of the quantity of the pollution which the air receives, especially in a city like Liverpool. For if an observer views the air of the town from any elevated position he will see the ten thousand chimneys pouring down their contents on to the inhabitants below, and again in walking the streets you have every few yards the sewer ventilators discharging their foul emanations.

The impurities are various in their nature, and include bodies or gases invisible and inodorous, odorous invisible bodies, odorous visible bodies, such as coal smoke and flue dust, etc., organic exhalatious bodies, microscopic organic germs. It will be unnecessary to dwell on the production and injurious nature of each individual substance enumerated above; for our purpose we will classify them into two groups, namely, smoke or chimney exhalations and sewer gas. It will, however, be as well for us before proceeding to examine the sanitary arrangements of the present day to take a glance back as far as we have any record, and endeavour to trace the progress from the earliest period.

The first records of any laws upon the subject of health are the Mosaic, and in studying them over, although at a distance of three thousand five hundred years, we cannot but be struck with the fact of how little we have advanced, or, perhaps more correctly, how those ideas have guided succeeding generations, especially in diseases of an infectious character, such as leprosy, those afflicted being placed in quarantine for seven days, and if at the expiration of that period the disease had not spread, the priest pronounced them clean, and after offering certain sacrifices the sufferers were again allowed to mix with their brethren; but if at the end of seven days the leprosy continued the poor unfortunate was banished the camp. Wherever the houses became infected with leprosy, the infected part was to be taken out and cast into an unclean place without the city, new stones and plaster were to be used in their place; if, after this repairing, the disease again showed itself the house was to be razed to the ground and the stones cast into an unclean place outside the city. If, however, the plague did not show itself after the repairing the walls were sprinkled with hyssop and cedar and blood, partly, doubtless, as a disinfectant, and partly as a religious ceremony. The laws of quarantine are practically the same to-day as they were three thousand years ago, and the separation of the infected from those that are free, which seems to be dawning upon the authorities as desirable, but by no means essential, was very stringent, any failure upon the part of the infected being punishable with death.

We next find that the Italian tribes worshipped the pastoral goddess Pales, and were in the habit of calling down blessings for the fruitfulness and health of their flocks; but evidently at that date full reliance was not placed upon the blessings of the goddess, as they found it necessary or helpful for the health of their flocks to pass them through the fumes of sulphur. We also find that Ulysses was acquainted with the value of sulphur, as he used it for removing the smell arising from the dead bodies of the suitors for the hand of his wife after their massacre.

For many centuries little was done to prevent the spread of infectious diseases, the ravages of the plague decimating the world, and as the population increased the huddling together of the poorer classes always gave a foothold to any epidemic, as was so vividly witnessed by the plague in London, in 1665, when the deaths were over 100,000, and during the visitation of cholera to Europe in 1830 to 1834, the deaths in the Caucasus were 10,000 in a population of 16,000, and in one province of Russia the deaths were 31,000 in 54,000. In 1666, the year following the plague in London, came the great Sanitary Engineer, the fire, destroying the unhealthy and unsanitary rookeries, where, during the previous year, the plague had held high festival. At the end of the eighteenth century some attention was paid to antiseptics: the list of those recommended, at any rate, gave sufficient for anyone to choose from, but their value, in most instances, was very small, as the following list will show:—alkalies and salts, gum resins, such as myrrh, asafœtida, etc., decoctions of Virginian snake root, pepper, ginger, saffron, sage, mint, valerian, rhubarb, senna, wormwood, celery, turnips, carrots, garlic, onions, cabbage, horseraddish and molasses. More attention was also paid to drainage of houses and streets. Wooden pipes, of which a specimen in oak 6 feet 6 inches long, 7½ inches square and 3½ inches bore is shown at the Health Exhibition, taken from Hackett's Hotel, Piccadilly, London, and supposed to have been laid down about one hundred years ago, brick drains, wood troughs and common tiles being used, generally having an outlet into a cesspool for all the matter that had not previously percolated through the wooden troughs and joints of the tiles, the heavier portion settling to ths bottom and the liquid running over. The cesspool, being placed generally in a place not lending itself to easy access, was only cleared out when the stench became unbearable or some serious outbreak of disease drew attention to it. Following this period we come down to the visitation of cholera to this country in 1832, when the public mind was specially directed to improvements in sanitary matters. It is only, therefore, within the last fifty years that the subject of sanitation has had much attention paid to it; but during that period much work has been done under the Public Health Act and the separate Acts of Parliament for

* Read at an Evening Meeting of the Liverpool Chemists' Association, October 23, 1884.

most of our large boroughs and local board districts. The engineer has been called in, vast waterworks have been formed, and water at high pressure is now obtainable in all our large towns and most of our smaller ones; thousands of miles of sewers and drains have been made; thousands of miles of streets have been paved with setts and the parapets flagged; thousands of old houses, veritable dens of disease, have been swept away; time-honoured grave-yards have been closed and cemeteries opened, originally placed at some distance from the centres of our dense populations, but which now, unfortunately, with the rapid growth of our towns are surrounded as much as the old church-yards were. The question of the disposal of our dead is a matter that will have to be faced, and let us hope that public opinion may be guided to the rational system of cremation. The great demand for sanitary work has called into the field inventors by the hundred, with their patent sockets, glazed earthenware pipes in place of the old wooden trough, stench traps and ventilators for the streets, patent water-closets by the score, etc., etc., so that the engineer of the day has had nice material to work with, and with it he has doubtless made a good show in our houses and left substantial work in our streets. But still, with all this skill and all these improvements, and the many millions of pounds sterling that have been spent and still are being spent to carry them out, the undeniable fact still remains that the death-rate of the kingdom is fully one-third greater than it should be, and that the general sanitary arrangements are provocative of disease instead of being preventive. Sir Robert Rawlinson, C.B., states that in Dublin and its vicinity there is not a single residence in a satisfactory condition, and in the metropolis it is stated, on the experience of sanitarians, that there are not five hundred houses properly and safely drained. You may go further and say that there are not five hundred in the kingdom, and also that, to a great extent, the millions spent on the vast sewerage schemes have been literally, not figuratively, thrown into the gutter and thence into the sewer; that in all these great and small schemes, whatever the object has been, the effect is to make sewer gas and poison the people, and that the first principles of sanitation have been openly and wilfully neglected, "*the prevention of decomposition or fermentation.*"

What is the result of decomposition? Sewer gas and germ development. Sewer gas is formed of various bodies or component parts, as CO, CO_2, C_nH_nN, etc., SO_2, SH_2. Whilst the fermentation is going on zymotic or germ development is caused. That is, pre-existing germs becoming active organisms by fermentation taking place, as Pasteur demonstrates, by atmospheric influence, "not upon its oxygen or any gaseous constituents, but upon minute particles suspended in it, which are germs of various low forms of existence." Professor Tyndall calculates that germs equal to the population of the world could be placed on four square inches, and that one million could be piled on the head of a pin. Among the interesting facts pointed out by Dr. Duclaux, in his valuable work on fermentation, the rapidity of development of some of the lower forms of life stands out in prominent array. Speaking of the development of certain germs (bacteria), he says, Cohn "found that it would take two hours for two living organisms proceeding from segmentation in certain bacteria to attain the dimensions of the parent, and in their turn to multiply. Hence in three days the progeny of a single specimen if unhampered would number 4772 billions. As it is about the $\frac{1}{1000}$th of a millimetre in breadth and two in length, and as its density is about the same as that of water, 536 millions would be required to make the weight of a milligramme (about 0·015 of a grain English). It is then easy to calculate that the offspring of a single specimen would in twenty-four hours only weigh $\frac{1}{60}$th of a milligramme; but at the end of three days it would weigh 7500 tons." Such figures show us, in truth, that we must cease to wonder at the rapid spread of diseases when these germs multiply and increase at such an alarming rate. We thus find that our tens of thousands of miles of sewers and drains are forcing houses for germ development, the matter passing into the sewer. Commencing immediately to decompose, the sewers becoming one immense gas factory provided, as the law directs, with street ventilators which pour forth, both when we are asleep and when we wake, sewer gas laden with myriads of germs in a more or less active condition, ever ready and willing to attack the weak and ailing. The fatal results arising from this dissemination of sewer gas into our streets is indeed great, but can bear no comparison with the effects of sewer gas entering into our houses from water-closets, slopstones, etc. It is generally supposed that the water traps attached to water-closets, etc., are a perfect seal against the back pressure of noxious vapours from the sewer; but we only have to think for one moment and the fallacy is apparent. The depth of water in ordinary traps is some six inches, and the atmospheric pressure being sufficient to balance a column of water of thirty-four feet, it is self-evident that an increase of pressure in the sewers of only three ounces per square inch would overcome the six inches of water in the trap, and that as at present arranged they are only a delusion and a snare. Mr. C. P. Cotton, Engineering Inspector of Sanitary Work in Ireland, in a valuable paper read at the Sanitary Congress at Dublin, states, "I have seen sewer gas pouring back through a sink into a house in one of the best parts of Dublin (indeed my attention was attracted by the noise) owing to the filling of the low levels of the sewers by the tide." If further proof be needed that gas can overcome the water in the stench traps of houses we have only to refer to the account of the correspondent of the *Daily News* in Naples, that in burning sulphur in the sewers to disinfect them the fumes entered the houses through the closets during the night, nearly suffocating the inmates, driving them out into the streets where they aroused their neighbours and crying out that they were being poisoned intentionally.

Having proved that sewer gas is the result of decomposition and that fermentation is the cause of germ development, and that the sewers are always fully charged with the death-dealing compound, and that the sewer and closet traps are inadequate to deal with the gas, the question comes, Is there any method or means by which decomposition can be hindered and sewers utilized, as originally intended, for the conveyance of sewage to a given point without the matter undergoing change? Many schemes have been devised.

The system of Mr. Shone is one that has many features to recommend it, being very superior to the present plan; it is in operation at Warrington and Eastbourne. The plan is to connect the house drains with the sewer, this sewer being connected at one end with a tank sunk to a depth to allow any desired fall in the sewer. When this tank is filled to a certain point, a float connected with the valve of an air compressor is opened and the sewage matter is ejected into a sealed pipe and forced either into another tank at a higher elevation or direct, it may be, to a sewage farm several miles distant. The pressure of air employed is about 50 lbs. to the square inch, and at an exhibition at Warrington to show the power, the sewage was ejected from a tank into the open air to the height of about 80 feet. The olfactory nerves were soon satisfied of its efficiency, and if further proof was wanted, the descent of the vile compound amongst the invited guests quickly decided the matter. The late Mr. Spence, of Manchester, whose personal friendship I had the honour of having for many years, suggested, many years ago, a system of atmospheric or gaseous sewerage, the idea being to connect the chimneys of the houses with the sewers, leading them to centralizing conduits converging to a point where an immense chimney, 600 feet high, would be erected to discharge the gases into the atmosphere, the ascensive

power being obtained either from the retained heat of the gases, or if this was not sufficient, by the addition of artificial heat or a fan. Mr. Spence gave the figures for a chimney necessary for the purpose, proposing that the climney should have an internal diameter at the top of 100 feet, and an external diameter at the bottom of 140 feet, and estimating its cost at about £40,000. The capacity of the chimney for conveying smoke gases, on the calculations of a velocity of 40 feet per second, would be in twelve hours 480,000,000 cubic yards. The gases from the combustion of two million tons of coal per annum represents 46,000,000 cubic yards per day. So that the calculations allow room for nine times as much gas from the sewers, which would be very ample.

Mr. Spence stated that the value of the sewage from Manchester and Salford, with the ammonia contained in the coal, would have a commercial value of £800,000 per annum; during this gaseous process the sewage would be thoroughly disinfected by the sulphurous acid gas contained in the smoke. The Corporation could easily try the plan at Kensington fields, and it would have been very advantageous in the erection in Nash Grove for purifying the sewer gas pouring out of the ventilators; by this means the sewage would be disinfected, and the manurial properties contained in the smoke deposited. This scheme would undoubtedly act very well, though the expense of remodelling our houses and sewers puts the adoption of it out of court for the present. But where new towns are being laid out the adoption of the principle could easily be carried out, and as the central smoke stack would carry all deleterious vapours clear away, the houses could be made with flat roofs and laid out as flower gardens.

I could also propose the burning of fires in the streets over the ventilators; this would doubtless draw out all the bad gas, and the number of ventilators could be reduced, but this would interfere with the traffic, besides being an eyesore.

The placing of charcoal over the ventilators has an effect but for a brief period only, as was proved at Southport during the visit of the British Association. The poor levels of the sewers there always cause a pressure of sewer gas when the tide is up, and walking down any part of the town the smell is anything but pleasant. The visit of such a learned body to Southport was an event of which capital could be made, and the Corporation, always zealous in forwarding the interest of the inhabitants, bethought them that if they could only get the sewer smells done away with during the meeting they would be enabled to get a testimonial as to the salubrity of the place, and its freedom from noxious exhalations. Charcoal filters were applied for a few weeks, and the result was all that were required, but they were, I believe, done away with as soon as the object was attained.

With the exception of Mr. Spence's system decomposition of sewage matter must and will take place, for even if Mr. Shone's system were generally adopted the sewage matter would require deodorizing prior to being placed upon the land. In nature's economy it was doubtless intended that refuse matter should return to the land to increase the productiveness, but so far, with only one or two exceptions, such as Aylesbury, Aldershot, etc., sewage farming has been a failure commercially. Not that the ratepayers would grumble at being taxed to cover the loss; but the enormous quantities to be treated and the confession by those in authority that the money already spent on sewage schemes was of little value, will prevent for a long time the subject being grappled with. What we must look to in any case is the prevention of decomposition, and the application of antiseptics in our houses before the kitchen refuse and excreta from our water-closets pass into the sewers. By this means the enormous amount of sewage matter daily discharged into our rivers would be thoroughly disinfected, and no ill effects from sewer gas would be perceptible. In the case of the Thames, 160,000,000 gallons per day are discharged into it, and often in consequence of the lowness of the upland water there is from fourteen days to thirty days' sewage washing backward and forward at the rise and fall of the tide, awaiting a freshet to carry it out to sea, in the meantime throwing off its vile gases continually.

If the Commissioners of Sewers were to see to the application of antiseptics prior to the matter passing into the sewers the houses and streets of the metropolis would be pure, and the Thames, although often containing sewage matter in motion, would not throw off any objectionable or dangerous exhalation. When we know that at the outlet works on the Thames the Commissioners used during August 180 tons of chloride of lime per week, the effect being extremely beneficial as far as the river was concerned, although the matter had then undergone considerable decomposition, it is self-evident that if the antiseptic were applied before fermentation commenced a much less quantity would be necessary.

This being proved, the question will be, What are the most powerful antiseptics and disinfectors? The most effective and active are those which evaporate or throw off their essential gases, as chloride of lime and tar acid. The objection to chloride of lime is that it so quickly deteriorates and becomes worthless and acts only as Angus Smith says, "upon putrefaction that already exists;" but tar acid acts upon the process and prevents the tendency to putrefy. The action of the best known tar acid, carbolic, upon germ development has been so amply proved by the highest authorities that it is needless to discourse further upon its merits, but I would draw your attention to a rival preparation that undoubtedly will be much heard of in the future, it is made from a combination of tar acids, and has many points in its favour for which it will doubtless receive the preference.

MODERN COMPLEXIONS AND COSMETICS.*

In a book of suggestions for the distiller's and analytical chemist's use, published about 1840, there are some vague and desultory remarks about face powders, which, says the writer, with an amusing air of *cela va sans dire*, "*are so little used among the ladies of America, it is scarcely worth while to give recipes for them; but,*" he continues, naïvely, "*the people of the theatre being compelled to use them, certain advice as to the preservation of the skin may not be out of place.*" Still the worthy author offers but few noteworthy suggestions on this most important part of the question. We have to wonder with a smile what his opinion would be to-day were he treating of articles of the toilette, and came to the astonishingly large item of face powders and cosmetics, or were he to see in every chemist's show-case the array of such articles made up under every variety of form and name, and sold by the thousand daily. The "people of the theatre" have learned thoroughly how to use their cosmetics, but the ladies of leisure and fashion are so ignorant of the *science* connected with the care of the complexion that cases where the skin is completely ruined are of every-day occurrence, and it seems impossible to credit that only forty years ago a sign of fine-ladyism or delicate breeding was a fresh *natural* complexion. With the abandoning of powdered coiffures, rouge and face powder were given up by all ladies of fine feeling and "natural complexions;" the reign of the "lily and the rose" of good health and care began, and this was as much the *fashion* as is the modern or recent style of artificial pink and white.

But if powder is a necessity of the toilette of any lady to-day, let her first wisely and systematically consider the care of the skin to which she applies the cosmetic, and next the kind of powder or paint to be used; and on this subject actresses and public performers could teach a valuable lesson. It is a fact not generally known, yet

* From *Harper's Bazaar*. Reprinted from the *American Druggist*.

well worthy of consideration from its significance, that nineteen out of twenty of the leading ladies on the stage at the present day have the most charming *natural* complexions, which endure the ravages of stage "make-up," of time, and of late hours far better than that of the ordinary society belle, who half a dozen times a day gives her face a little dab of powder, laying to her soul the flattering and deceptive unction that it is "*only* rice powder." The minor people of the theatre, such as have neither time, wit, nor forethought enough to consider the future of their complexions, nearly always powder and rouge carelessly and too frequently, thereby growing "pasty" and sallow, wrinkled and furrowed, early, just as does the society girl who "beautifies" in the same unscientific fashion.

Anyone seeing a theatrical "make-up" for the first time might well have the opinion that it could ruin the skin, but the most noted actresses, as we have said, have acquired an art of preservation which few outside the profession understand.

Let us consider their first rules—and we would here state, as a preface, that any facts given or suggestions made are from the very best authorities, the result of thorough investigation, and the recipes or directions offered are from private sources, in nearly every instance based on experiments and on final results which may be called amateur or original, yet have been tested with every possible satisfaction.

To begin with, then, the professional lady's first thought is entire *cleanliness*. A well-known and beautiful actress says that she would never *touch* her powder without washing her face thoroughly first. The pores being cleansed, the powder is more easily removed, and does not form a crust, as it were, which is hard to entirely take off. Next a cold cream, fine vaseline, or home-made white pomade is rubbed softly over the face, wiped very lightly, and then the powder is applied. A soft puff or a piece of cotton flannel may be used for this purpose, and it is better to make two or three *light* applications than to rub it in at all *hard*. The best stage and home powder is made of the simplest material—common prepared chalk subjected to a *baking*, or fine pearl starch *perfectly* dry, and mingled for some days with dried rose or orange leaves, the flowers being sifted out before using, and changed every twenty-four hours. Few *liquid* cosmetics are as harmless as the above; still there are some valuable recipes which can be made up at home or to order, and which fulfil all the requirements of a cosmetic without special injury to the skin, if, as in the cases of the body powders mentioned above, cleanliness before and after using be strictly attended to. Among the best are the following:

Mecca turpentine, 1 quart; oil of sweet almonds, $1\frac{3}{4}$ ounce; spermaceti and white wax, each $\frac{3}{4}$ of a drachm; flowers of zinc, $\frac{1}{3}$ of a drachm; rose-water, 2 drachms.

This should be mixed over either a water or a sand-bath, and is supposed to remove roughness of the skin, and whiten it finely.

A still more efficacious paste for curing splotches and inducing free action of the skin in Bazin's *Axerosine*, rarely to be purchased pure, but of which this is the authentic recipe.

Take 4 ounces of green soap of commerce, 2 ounces of spermaceti, and melt them over a water-bath in 6 ounces of oil of sweet almonds; then add 2 ounces of soap powder, and when the mixture is complete, put it into a marble mortar, and rub in, little by little, 4 ounces of pulverized bitter almonds, and then $\frac{1}{2}$ a drachm of essence of rose, and 1 drachm of vermilion, thinning the latter first in a mortar with a few drops of essence of bergamot.

This paste has been extensively used in France and Italy, and is said to be not only a good cosmetic, but a preventive of roughness after fever, small pox, etc., and of chillblains.

Still another, which comes to us from foreign sources, and is not well known here, is the Oriental pomade, which is considered in the East as invaluable for softening and freshening the skin.

Melt over a water-bath 1 ounce of white wax and 2 of spermaceti; remove from the fire, and then add 8 ounces of oil of sweet almonds, 8 ounces of oil of white poppy, and beat together without ceasing until the mixture grows white, then add $\frac{1}{2}$ ounce of Mecca balsam and 1 gill of rose-water, rubbing until it will take in no more rose-water, and breaks away in large flakes or lumps. Put it into pots, and cover each with a little rose-water.

Still one more consists of equal parts of the oils of sweet almonds, poppies, and olives, with four drops of liquid balsam af Peru, 2 drachms of spermaceti, and $1\frac{1}{2}$ drachms of white wax; melt together over the water-bath, and add the balsam when the rest is well beaten together.

Oriental and French ladies who know of this use it for preserving the skin in rough weather, and consider it decidedly beautifying to the complexion.

If any large quantity of powder or cosmetic has been used, it is always advisable, say "professional" ladies who are careful, to rub it off the face before retiring, by means of a fine cold cream or vaseline, wiping the face afterwards gently but thoroughly with a soft piece of old linen. Any cosmetic, purifier, or beautifier which has to be applied at night is best used after a warm bath, and an excellent preparation for such is to wring a flannel out in very hot water and lightly but thoroughly wipe the face with it. This is also very good if one is inclined to flush after exercise in the cold air.

Many people find that late hours, weariness, or ill health produce furrows—hardly to be called wrinkles—in even a young face. For such, and to recuperate vitality, an excellent recipe is one which Madame De Maintenon used for years, and is called the *Pommade du Triaxon*.

Melt 1 ounce of white wax, and incorporate thoroughly into it 2 ounces of the juice of lily bulbs, 2 ounces of honey, 1 ounce of white wax, and 3 drachms of rose-water. On going to bed apply it to the face, and in the morning rub off with a soft linen cloth.

A mixture of 4 ounces of oil of sweet almonds, 2 of deliquesced tartar, 1 of fresh jonquil, and two drops of Rodia is said by French authorities "on the boards" to be an admirable application at bedtime.

A famous French authority was one Madame Delacour. Her cosmetic milks were said to be highly thought of by the beauties of the French court, but the most celebrated of her "inventions" was the preparation for the lips.

One drachm each of oak galls, pomegranate, and sumac, $\frac{1}{2}$ drachm each of myrtle leaves and sulphate of zinc, 4 ounces of rose salve, 1 ounce of wax, 1 of spermaceti, and 1 of sweet almonds, 2 drachms of virginal milk, twelve drops of Mecca balsam—perfumed with any essential oil.

We append to these a recipe for the removal of pimples or blotches, which is considered in one family circle so valuable that it is handed from one to another as a precious legacy.

Fifty grains of distilled water of cherry laurel, 75 grains of extract of lead, 7 of tincture of benzoin, and 30 of alcohol; shake the benzoin and alcohol together, and then the whole very thoroughly.

But for all the virtue in recipes it is impossible to do more than generalize, as what influences one complexion well is injurious to another. We know, for example, where in the same family two sisters have to use totally different creams and pomades. Glycerine will agree with some, and start a feverish eruption with others; while some have to strain vaseline or dilute it before using, and others cannot use it at all.

One pound of alum, with 1 ounce each of white sugar, gum-arabic, and carmine, mixed and pounded to a fine powder, sifted through a fine cloth, and tied loosely in a bag, is said to be very good for ring-worm or red blotches

on the face. It is used moistened with fresh water, and rubbed gently over the skin.

Fresh air, the use of the flesh-brush, copious bathing, and careful diet—these, after all, are the first inducements to a lovely complexion, and the remedial preparations ought only to come in use for jaded hours, or when the skin needs some such outward medicine. The French idea of that youthful *beauté de diable* supposed to belong to irregular features and elusive charms, and exclusively to youth, really has for its foundation a fresh, clear, healthful complexion—the white or the olive pure, the pink coming and going in soft currents just beneath the skin, never degenerating into a heavy flush, or dying away to pallor. Given this first charm, any woman may put up with a nose a trifle too short or a mouth too wide. It indicates such a state of internal well-being that it comforts the mind and eye far more than all the pearl-white and rose-pink "creations" of all the Boyers, Langes, Blaques, or Delacours in sxistence.

TENGKAWANG FAT, OR VEGETABLE TALLOW.*

BY H. P. BAKKER, OF SANGGAU.

As of late years the tengkawang attracts more and more attention, I have deemed it expedient to collect what I know about the growth, the crop, the preparing and export of the tengkawang fruits in the present article, and though it makes no pretensions to scientific value,† yet I flatter myself that the contents will be found interesting enough to deserve the attention of the public.

Formerly only the tallow of the tengkawang used to be exported from the west coast of Borneo, but since 1878 a change has taken place in this, and the dried pulp of the fruit also is shipped to Singapore.

The tengkawang grease, or vegetable tallow, called by the natives "minjak tengkawang," is the produce of the fruit of a tree, of which there are half a dozen varieties; four of these are designated as "tengkawang," also "engkawang" and "engkabang," while the other two are reckoned by some as belonging to the same class, by others not. The first four, called in this article the tengkawang proper, are:—

The *T. toengkoel*,
the *T. rambei*,
the *T. lajar* and
the *T. goentjang*.

The two other sorts are:—

The "madjau" and
the "terindak."

The grease, prepared from the fruit of the latter trees, bears, like that of the other sorts, the name of "minjak tengkawang."

All the varieties of the tengkawang proper are found growing wild in the whole of the Residence "Westeraf-deeling Borneo," with the exception of the regions lying along the River Kapoeas, beyond Silat, while the "madjau" and "terindak" seems to occur everywhere in those parts. The region where hitherto the most tengkawang is collected, is "controle-afdeeling" Sanggau and Sekadau, and the Indian appellations, given them in this article, are those which are in general use there.‡

Let us first examine the tengkawangs proper.

The trees, with the exception of the *T. goentjang* prefer the banks of river and rivulets, especially the "tandjongs" or land-tongues, formed by the bends of the latter, where the loam is mixed with sand, and the soil is, moreover, more humid than on other spots. But they also appear on heavy clayey soils and on the mountains, though they thrive there less luxuriously and yield fewer fruit. Though they can bear up against inundations of short duration, and seem even to thrive the better for them, yet an inundation of long standing is fatal to them. This was the case after the flood of the Kapoeas in August and September, 1878, when thousands of tengkawang trees perished, which entailed great loss to the population.

The *T. goentjang* is distinguished from the other three species, first, by its thriving best in soils which, situated on the upper courses of creeks, are occasionally submerged in consequence of insufficient drainage; and, secondly, by the trees not growing higher than 6 to 7 metres, and the stem not thicker than 0·15 to 0·20 metres. For the rest its outward appearance is like the other sorts, but its fruit are rather larger than those of the *T. rambei*.

The trees of the *T. toengkoel*, *T. rambei* and *T. lajar* are very much alike outwardly. They consist of heavy trunks that branch off not very high above the ground and bear only a few main boughs, which, when the tree has the necessary space (which is but seldom the case) are thick, long and almost horizontal. With their manifold side branches and large leaves these main arms form a heavy, thick tuft.

At the base the trunk is not round, but throws out several shoots (banirs). The roots are thick and run out far along, and even partly over, the ground.

The biggest are the trees of the *T. toengkoel*; but specimens of the *T. rambei* and *T. lajar* with a trunk 1 metre in diameter are not rare.

The wood of these trees is light and soft, and is classed here among the inferior sorts. Exposed to air and damp it soon rots. The trunks are used for floaters under floating-houses, and they are also sawn into planks, which are very fit for wainscottings indoors.

The fruit of the *T. toengkoel* are in their cross-section almost perfectly round, lengthwise oval, and rather pointy at top. Those of the other three sorts are of the same shape but rather more tapering. The pulp is of a yellow colour; on germinating or drying it mostly splits into four.

This pulp is enclosed in a hard ligneous shell with a smooth surface. At the foot the fruit bears five thick ligneous leaves, which are pretty firmly joined to the shell; a part of it runs out into membranous appendages which surround the shell, but are loose. These appendages the natives call "sajap" (wings). They are in the *T. toengkoel* a little longer than the fruit, in the *T. rambei* and *T. goentjang* still longer, and in the *T. lajar* they attain even a length of 0·15 metres. In this variety they form a kind of chalice, in which the fruit is completely concealed, and are, moreover, tough and hard.

The fruit of the tengkawang proper grow in bunches, as also the *rambei*. Those of the *T. rambei* are about of the same size as the forementioned fruit, thence the name of the tree. The fruit of the *T. lajar* have about the same dimensions, but those of the *T. goentjang* are rather larger; the largest fruit, however, is produced by the *T. toengkoel*, of which I have seen some of the

* From the *Indian Mercury*. Reprinted from the *Tropical Agriculturist*.

† A scientific treatise of the tengkawang was produced by Professor W. H. de Vriese, in 1861, entitled 'Minjak Tengkawang,' also Bishop Grevelink's 'Planten van Nederlandsch Indië,' 1883, p. 456, 199, and 'Minjak Tengkawang and Minjak Tangkallah,' Ind. Gids, 1881, i, p. 350.

‡ In the well-known work of de Sturler, 'Handboek voor den Landbouw in Ned. Oost-Indië,' p. 686, et seqq., several sorts of tengkawang are quoted that are unknown here, such as *T. blongsong*, *T. vinit*, *T. batoe* and *T. rabe*; but probably these are only other local appellations for the sorts mentioned here. The *T. penang*, also mentioned, is indeed found here, but its fruit is not collected, because the proportion of fat is too insignificant to be worked with profit. It appears by the work quoted that the "terindak" belongs to the genus *Hopea*, and I believe that the "madjau" too ought to be included. Nevertheless, I have thought it proper, for the sake of a convenient view, to call the *T. toengkoel*, *T. rambei*, *T. lajar* and *T. goentjang*, the tengkawang proper, in contra-distinction to the "madjau" and "terindak."

size of a duck's egg. Why this sort is so called is not very clear.

The *T. lajar* owes its name to the fact of its fruit not falling straight downwards, but by the resistance of its outward bent wings float hither and thither before reaching the ground, which the natives call "belajar" (sailing).

The fourth sort is called *T. goentjang*, because the fruit is made to fall by shaking (*goentjang*). As it is much less frequent than the three other sorts, and every tree produces, besides, only a couple of catties of dried fruit, we will leave it without further notice. To obtain the tallow the fruit is treated in the same manner as that of the *T. toengkoel*.

For a good produce it is necessary for the dry monsoon to last long, with a little rain it is true, but without heavy showers, Moreover, the transition must be gradual, and the wet monsoon not bring too much rain; for heavy showers in the transition season cause the blossoms to fall off before the fruit are formed, and even the young fruit are also subject to fall if the rainy monsoon is too tempestuous. As now, in these parts, especially in the dry monsoon and in the transition season, rains are mostly preceded or attended by high winds, it is a matter of course that the tengkawang proper but seldom gives fruit.

Frequently the trees will blossom luxuriantly without yielding any crop.

This is the case with all the four sorts of the tengkawang proper. If one kind bears the others will bear too, and otherwise none of them will produce anything.

It is calculated that the tengkawang proper bears fruit once every five years. Sometimes, however, a period of eight years will intervene between one crop and the next, and in general, perhaps, a good crop will occur only once in thirty years. Though much fruit was gathered in 1878 and also this year, yet the produce in those years is reckoned to have been below mediocrity. This year, according to a fair estimate, only a fifth part of the trees bore fruit, and that not even abundantly.

As has been said above, the tengkawangs proper are all found growing wild. The *T. toengkoel*, *T. rambei* and *T. lajar* grow in some places by hundreds and thousands together along the Soengeis (smaller rivers), and this is not surprising, when we consider that the fruit, falling to the ground, germinate in a few days, or floating on the water are carried down by the current and are arrested lower down on several projecting spots.

Such woods are nobody's private property. Anyone may gather as much fruit as he likes; only the self-ruling Radjas have from old the right to keep the population from some of these woods and have the fruit reaped for their own use.

Of the different tengkawangs the *T. toengkoel* is the only one that is cultivated. Such plantings, like those of other fruit trees, are called "tembawangs." This word can hardly be rendered by *gardens* or *orchards*, for the trees are planted without any regularity, and scarcely anything is done for their culture.

Formerly many plantations of tengkawang were met with along the banks of the Kapoeas; but the inundations of 1878 have destroyed them all, except those planted on hilly grounds.

Opposed to these plantings of tembawangs stand the kampongs, that is groups of trees of one and the same kind growing wild. In the same way the well-known iron-wood ("teblian") grows in kampongs.

He who plants a tembawang remains the owner thereof. He may transfer his rights to others, and these rights, on decease, pass to the heirs, but very rarely are the tembawangs divided after the death of the proprietor. They mostly remain the joint property of the heirs.

The planting of the *T. toengkoel* takes place in the following manner:—A piece of bamboo 0·2 metres to 0·3 metres in length is filled with earth and the fruit put upon this, very soon it begins to shoot, and in three or four months the stem has already attained a height of about ½ a metre and given birth to three or four leaves. Then the remains of the fruit pulp are removed and the bamboo with the plant in it is planted in the ground. This is generally done in fields that have served for growing paddi some months after the harvest of this plant; for the wild wood is then not yet grown up high, and therefore need not yet be cut down.

The fruit of the tengkawang soon germinate. If they remain lying on moist ground the first shoots of the root appear within ten or fourteen days; the hard shell is then of course already burst open and disengaged along with the other appendages from the pulp.

The planting is rarely performed regularly, and always too close together. Sometimes the intervals between the young plants are only one or two fathoms. The native says that he plants them so close together because a part of them always die, and he intends afterwards to cut down the less vigorous plants.

The plants now set in the open ground are mostly abandoned entirely to their fate, and grow up along with the wild wood. This acts prejudicially to their development, but, fortunately, they grow up pretty quickly, and thus partly remain alive. During the first years the wild wood is seldom or never cut down, and mostly the planter does not look after his property till the advent of a tengkawang year, so commonly fully four years after the planting. He then cuts away the wild wood so that, it is true, the tengkawang trees now come to stand rather freer, but yet much too crowded. It would indeed be desirable to clear away also the poorer trees; but as these have already attained a certain size, he finds it a pity, and leaves them there; so then the trees are in each other's way, shoot up thin and bear fewer fruit.

It would appear that earlier generations used indeed to thin their plantations. At least, in old tembawangs the trees often stand at a proper distance from each other.

For the rest nothing more is done to the tembawang till the trees have blossomed and the fruit appear. Then all the wild wood is lopped away with the object of facilitating the gathering of the fruit, admitting a freer access of wind and air, and preventing monkeys and other animals from reaching the trees by means of the wild wood.

In a wild state, of course, the trees grow much more irregularly even than in the plantings.

About the growth of the tengkawang and the age at which they begin to bear fruit, it is difficult to give any reliable statements. Both depend so much on the nature of the soil, and as regards the *Tengkawang toengkoel*, also on the way of planting. Some of the stems of the latter species have at five years of age a diameter of 0·15 metres, and some there are which at forty years of age first attain the size of 0·60 in diameter.

Some plants commence bearing a few odd fruits in their eighth year, but, as a rule, it seems that this does not occur till the twelfth or thirteenth year.

It is also difficult to infer how much fruit a tree can produce. As to the tengkawang, this is even impossible, as in a wild state the young and old trees grow promiscuously. Of the planted *T. toengkoel*, however, it is generally said that old trees, that are planted in good soil and can grow out freely, produce, in good years, so much fruit as will yield 100 gantangs* of "paddi tengkawang." The meaning of this term will appear later.

One with another, however, it has been reckoned that the fruit of good trees yield from 20 to 40 gantangs of "paddi tengkawang," and a crop of 100 gantangs is therefore no rarity.

* The gantang is a measure of various capacity in various parts. At Sanggau it is equal to about 3½ litres. In measuring "paddi tenkawang" the gantang is not swept off clean to the brim, but is left with a head, as is done in Holland in measuring potatoes.

As the price of the paddi tengkawang has varied this year from 8 to 11 dollars, it may be assumed that the produce of one tree, worked to the article aforesaid, is worth from 1·5 dollars to 4 dollars; in exceptionally favourable cases even 11 dollars.*

Let us now proceed to describe the manner in which the fruit of the tengkawang are gathered in and worked. As we have seen, the planting and maintenance of the tengkawang plantations cost the native very little labour. Nor does the heavy work begin till the fruit are ripe.

As soon as it appears that the tengkawang bears fruit, the Malay population bestir themselves, forsaking their habitual indolence. You hear then of nothing but the tengkawang, which is very natural, as it yields the population so much profit. Malayans and Dajaks, who have tembawangs, cut them open and build therein cabins, while such as wish to collect forest tengkawang devote themselves with all their might exclusively to that purpose. As soon, now, as the fruit is so ripe that they are likely to drop, men, women and children leave their homes and settle in these said cabins, the consequence of which is that the Malay kampongs are often abandoned by three-fourths of the population.

The fruit are not plucked off, they are allowed to drop. The native here says that the plucked fruit yield less tallow.

If now at such a time the weather is tempestuous it is a great advantage to the population, for then the fruit fall in vast numbers, and the gathering is soon accomplished; otherwise it may last six weeks or two months. A beginning is made very early in the morning to collect the fruits; these are picked up from the ground and cast into a basket carried on the back, and afterwards carried home, the whole day long. That this work is begun so early as at peep of day is to prevent the fallen fruit of the foregoing night from being stolen, and, moreover, because the wild hogs are exceedingly fond of them. In the woods, where a number of trees are crowded together, there is less danger of these animals, but in the more retired tembawangs they are a very plague.

When the fruit are brought home they are beaten with a stick so long till the appendages mentioned above are removed, and then they are thrown into heaps till the gathering is done. It is advisable to protect the fruit against rain, as otherwise some of them will soon shoot, which must act prejudicially both on the quality and quantity of the tallow.

The ingathering of the *T. lajar* is generally performed in a rather different way. The wings of the fruit are bitten off as they are picked up, which is no easy matter, as they are very tough. For this reason the fruit are sometimes left simply a few days on the ground till they begin to germinate, and the wings with the hard shell loosen of themselves. When the gathering is accomplished the greater part of the gatherers return home.

Then large baskets are made of split bamboo, which can contain from 400 to 500 gantangs. The fruit are put in these, and thus suspended in the water on rafts, whereby it is a necessity that the baskets be not full, lest the fruit, that swells enormously by being steeped in water, should burst them. Care must also be taken that they remain quite under water to prevent the fruit from rising to the surface and germinating.

This steeping of the fruit in water has the following consequences:—First, the shell becomes softer and bursts of itself by the swelling of the pulp. Secondly, the tengkawang, that has remained long enough in the water, is less exposed to the attacks of the "boeboek" (worm); and, thirdly, it is pretended that the quantity of tallow increases considerably by the action of the water upon it, and is more easily extracted from the fruit. Whether the proportion of tallow actually increases is a thing that I will not determine; it is, however, a fact that the longer the fruit remain in the water the more tallow can afterwards be obtained from them; but this may also be explained by the common union of the parts of the pulp being broken by the action of the water, and the separation of the tallow thus becomes easier.

It is better to leave the fruit for thirty or forty days in the baskets, but sometimes they are there as long as three months. A shorter period than thirty days, however, is not advisable, because then the paddi tengkawang is liable to be infested by the boeboek, and yields less tallow. Whereas if the fruit is left longer in the water it does result in a more copious yield of tallow, but at the expense of the quality and the peculiar yellow colour which distinguishes the superior tengkawang tallow. It is also specifically lighter.

After the fruits have lain long enough in the water, they are taken out and peeled by hand, or else the shells are beaten off with a piece of wood; the pulp then mostly splits into four and is much swollen. The next process is the drying, on frames knocked up in the interim and not covered, on which the fruit are spread out. On the appearance of rain they are covered up, and every evening they are brought in-doors to expose them again in the morning till they are quite dry. Then they are called "paddi tengkawang," which term implies the dried, split pulp. If the paddi tengkawang is not stored up quite dry it will soon rot; but if the process is carefully attended to, it can keep a whole year.

The above treatment of the tengkawang fruit, which might be called the wet treatment, is in general use in the Kapoeas territory. A very different treatment is adopted in other parts, for instance, in Landak. The treatment in use there may be called the dry process. The fruit are not at all steeped in water, but are dried, even over a fire. The paddi tengkawang obtained in this manner is, according to the general opinion of the natives here, of much less value than what is obtained by the wet process. It is soon attacked by "boeboek" and yields also less tallow; but then again the tallow is much harder.

(*To be continued.*)

* The dollar values now at Sanggau *f* 2·25.

QUASSIN AND ITS CONSTITUTION.*

BY V. OLIVERI AND A. DENARO.

In order to prepare quassin from quassia, 10 kilos. of the finely divided wood are twice extracted with 45 litres of boiling water, and the solution evaporated to 10 litres at a gentle heat; when cold, the quassin is precipitated by tannin, collected, washed, and after being mixed with a sufficient quantity of lead carbonate, it is thoroughly dried at 100°. The product is then extracted with boiling alcohol, the alcohol distilled off, and the residue set aside until it deposits the quassin in a crystalline state: it is, however, always contaminated with resinous matters, from which it is purified by repeated crystallizations from dilute alcohol: 30 kilos. of the wood gave 10 grams of pure quassin. It crystallizes in very slender, colourless, iridescent needles, which belong to the monoclinic system, the predominating form being the oblique prism with rhombic base. It melts at 210 to 211° (Christensen 205°), and is very soluble in alcohol, chloroform and acetic acid, but only sparingly in ether: 100 parts of water at 22° dissolve 0·2529; the aqueous solution becomes yellow on exposure to the air, is dextrorotatory, excessively bitter, and reduces Fehling's solution. The results of the analyses agree nearly with the numbers required by the formula $C_{32}H_{44}O_{10}$, and differ considerably from those given by Wiggers and by

* From *Gazzetta*, xiv., 1-9. Reprinted from the *Journal of the Chemical Society*, November, 1884.

Christensen, who proposed the formulæ $C_{10}H_{12}O_5$ and $C_{31}H_{42}O_9$ respectively.

When quassin is heated at 90° for some hours with dilute sulphuric acid (4 per cent.), it yields *quasside*, $C_{32}H_{42}O_9$, a white, amorphous, bitter substance, formed from quassin by the removal of the elements of one molecule H_2O; no glucose could be detected in the mother-liquors. It melts at 192 to 194°, and when boiled with dilute alcohol is reconverted into quassin, which crystallizes out as the solution cools. Quasside is also formed when quassin is boiled with acetic anhydride, but if sodium acetate is present there is a powerful reaction, and several substances seem to be produced; these have not as yet been submitted to examination.

Bromine diluted with acetic acid acts on a solution of quassin in the same solvent, and on adding water an amorphous resinous substance is obtained, but it does not crystallize; this melts with decomposition at 155°, and the results of the analyses suggest the formula $C_{32}H_{41}Br_3O_9$. Nitric acid added to an acetic solution of quassin seems to give rise to a nitro-derivative, which is precipitated on the addition of water. It dissolves in boiling alcohol, and, as the solution cools, is deposited again as a yellowish powder which melts at 130°.

If quassin is heated with concentrated hydrochloric acid in sealed tubes for four hours at 100°, methyl chloride is formed and escapes on opening the tubes; whilst the hydrochloric solution, when diluted with water, deposits first a resinous matter, which should be removed, and then, after a time, a colourless substance in small nodules. This new compound, which the author calls *quassic acid*, $C_{14}H_{19}O_3.COOH$, or $C_{28}H_{38}O_6(COOH)_2$, is far less soluble in alcohol than quassin, and crystallizes in silky needles which melt at 245°, and reduce Fehling's solution and ammoniacal silver nitrate in the cold. It seems to be formed thus:

$$C_{32}H_{44}O_{10} + 2HCl = C_{28}H_{38}O_6(COOH)_2 + 2CH_3Cl,$$

so that quassin would be the ethereal salt of quassic acid. The author has also tried the action of nascent hydrogen, and of boiling dilute nitric acid on quassin, but the products are resinous. Fusion with potash and oxidation with chromic anhydride also gave unsatisfactory results.

The resinous matter obtained in the preparation of crystallized quassin, and in all probability produced from the latter, was submitted to distillation with zinc-dust. The brown oily product was treated with sodium and fractionally distilled; the portion passing over at 170 to 190° when again distilled gave an oil boiling at 173 to 178° of the formula $C_{11}H_{16}$, whilst crystals melting at 76 to 78° were obtained from the residue in the retort.

THE HARVESTING OF CINCHONA BARK.*

The old idea that for the collection of the bark it was necessary to sacrifice or fell the whole tree, when grown to maturity, had long made way for a better view. In English India, Broughton had begun in 1866 to pollard the trees, in order to be able to lop the new shoots after four to five years (coppicing system) as is done in Europe with oak and ash coppice. But, besides the trees receiving a serious shock by this treatment, from which they do not so speedily recover, the bark thus obtained is not nearly so good as the stem-bark.

It was, therefore, an ingenious idea of Mr. McIvor, in the Neilgherries, to cover the stems with moss, in order to improve the quality of the bark. He was led to this by observing that the best—the so-called crown-cinchona—always occurs covered with moss. He made experiments in this direction and the result was that, not only was the quality of the bark improved, but that in this way it was possible to strip the stem of a part of the bark and to heal the wound thus made by covering it with moss, in other words, to renew the bark by artificial means.

By experiments on a large scale the new discovery was crowned with the best success.

The "mossing system" is almost universally practised in Java since 1879, and numerous chemical analyses have shown that the proportion of quinine in the renewed bark increases, and is even trebled. The "coppicing system" is now only practised when a rapid production of bark is required, or when the sort does not allow of the "mossing system"; the felling, or rather uprooting, of the tree, is still practised exceptionally, when it withers, or when the plantation requires thinning.

Lastly, by way of trial, another method has been followed for a short time, viz., scraping off the outer bark; but though this product offered a precious and valuable material for the quinine manufacturer, the "scraping system" has not been continued on account of culture and commercial considerations. If I do not mistake, the Ledgeriana (in chips) realized at the sales in Amsterdam in 1879 the enormous price of *f*10·44 per ½ kilogram. The quinine proportion was 13 per cent.

The "coppicing system" in a modified form, by leaving one shoot on the stem, is now generally and successfully practised in Java with the *C. Ledgeriana*.

The harvest of cinchona bark deserves a moment's further attention, as so little is known about it. Do not expect a description like "Les Vendanges" in Provence or Languedoc, or a mill-feast in a sugar-works in East Java, or of the padi-cutting in Java described by Multatuli. The reaping of the cinchona bark is unattended by poetical accessories, and the work-people are all quiet. In those elevated regions, sparsely populated, and then only temporarily, no clamour whatever prevails. All nature bears an appearance of monotony and gloominess. In the gardens and woods the sun can hardly penetrate; the trees mostly dripping with rain, or from the clouds floating above, it breaks down in a dreadful thunder-storm. Then the labourers—among whom are not unfrequently mothers with infants at the breast—experience all the miseries of a mountain climate at an elevation of 7000 feet. Shivering with cold, the women sit, sheltered as much as possible by a screen of plaited dried leaves, peeling the lopped branches, and cutting the wet bark to measure; the small silvers, or so-called refuse, is carefully collected in baskets.

The heavier work is performed by men; they lop the branches, or, if the mossing system be followed, they make incisions lengthwise in the stem, at intervals of 3 to 5 or more centimetres, according to the thickness of the tree, and then strip the stem from below upwards to where the branches begin, but in such a manner, that strips of bark of equal breadth are left alternately on the stem, by which it assumes somewhat the appearance of a fluted column. The strips of bark are then cut into lengths of 50 centimetres, and the stem, which is partially denuded lengthwise, is entirely enveloped, as is done in Europe to some trees that could not bear exposure to our winters. McIvor at Madras did this first with moss, and hence the name "mossing"; but as this material was soon exhausted in Java, recourse was had to alang-alang, indjoek or dried grass, which occurs in great abundance.

In the course of one year this envelope is removed, then the healing—the granulation we should say—the renewing of the bark is begun, and now comes the turn of the strips left on the tree the preceding year to be stripped off. Then the stem is again bandaged.

The wet bark, after being cut to measure, is dried either in the sun, or artificially, by which the pieces roll up in their breadth and thus form the familiar pipes. The packing is generally in jute-bags. They weigh about 75 kilograms.

From chemical investigation it has been proved that drying in the sun or by artificial heat is the same for the bark, and has no influence on the proportion of quinine.

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* From the *Indian Mercury*. Reprinted from the *Tropical Agriculturist*.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 22, 1884.

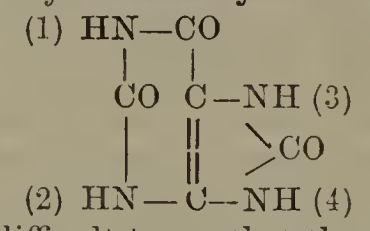
Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

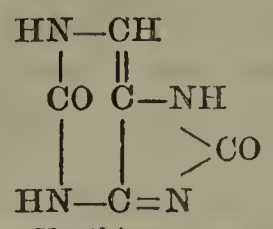
THE CONSTITUTION OF URIC ACID.

ALLUSION has been made on more than one occasion in the columns of this Journal to recent investigations of the chemical constitution of uric acid, a compound of the highest physiological and pathological significance in the human system. An opportunity was taken in reviewing Professor LATHAM'S book on the 'Formation of Uric Acid in Animals' (*Pharm. Journ.*, [3], xv., 119) to notice in outline the progress which has been made in our knowledge of this subject. It was there pointed out that HORBACZEWSKI'S synthesis of uric acid was essentially premature; that is to say, that although it rendered possible the artificial production of uric acid, it only to a very slight extent advanced our views respecting the molecular structure of the compound, a knowledge of which is absolutely necessary if we wish to understand its occurrence and regulate its formation in the human organism, as well as to explain its chemical behaviour. In the article referred to it was considered that the most comprehensive formula for uric acid was that proposed by MEDICUS, which satisfactorily harmonizes with all the known reactions of the compound. This rational formula has since received further experimental confirmation from some remarkable results which have been obtained by Professor EMIL FISCHER (*Ber.*, xvii, 328 and 776). The following is a brief sketch of the more important conclusions that he has reached. In uric acid there are four hydrogen atoms which can successively be replaced by methyl, giving rise to mono-, di-, tri- and tetra-methyl uric acids. From the manner in which these compounds split up when oxidized and hydrolysed, it is clear that the substituted methyl groups are each in direct combination with a nitrogen atom, and as the place of these groups is occupied by hydrogen in uric acid, it follows that uric acid contains four imidogen groups (NH). Uric acid when oxidized yields alloxan and urea, hence it is concluded that these imidogens are combined with carbonyl as residues of urea ($CO(NH)_2$), of which there will consequently be two in the molecule of uric acid. When hydrolysed, uric acid yields carbon dioxide and ammonia, together with glycocine, from which and the reaction of HORBACZEWSKI it is inferred that a residue of this compound is also contained in the molecule of uric acid. All this is symbolized by the formula of MEDICUS. Professor FISCHER has further proved the existence of two isomeric mono- and dimethyl uric acids. Beginning with the two isomeric mono-methyl derivatives, both these yield carbonic anhydride, ammonia, methylamine and glycocine when hydrolysed with hydrogen chloride, but are distinguished by their oxidation products; α-methyluric acid yields methyl-alloxan and urea, while β-methyluric acid yields methyl-urea and alloxan. The formula for uric acid proposed by FITTIG represents two urea residues combined symmetrically with a carbon chain and in no way indicates the possibility of isomerism. In the formula of MEDICUS the two urea residues are exhibited as unsymmetrically combined, thus—

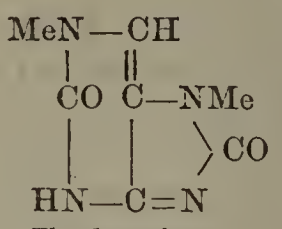


and it is not difficult to see that there is an essential difference in the manner in which the urea residues are each combined with the carbon nucleus and that the H-atoms at 1 and 2 might possess a different function from those at 3 and 4. If the H-atom at 1 or 2 (for in this connection there appears to be no difference between 1 and 2) be replaced by methyl a compound is obtained which by oxidation would be converted into methylalloxan ($CH_3N.CO.NH.(CO)_3$) and urea ($CO(NH_2)_2$); this behaviour corresponds with that of α-methyl uric acid. Whereas, if the H-atom be replaced by methyl at 3 or 4 the compound when oxidized would form alloxan ($CO(NH)_2(CO)_3$) and methyl urea ($CO.NH_2NHCH_3$). β-methyl uric acid reacts in this way and from the fact that when hydrolysed it yields glycocine it is inferred that the methyl is substituted for the H-atom at 4 and not at 3. Thus the formula suggested by MEDICUS satisfactorily accounts for the existence of two isomeric mono-methyl uric acids. Two isomeric dimethyl uric acids are known. One of these, β-dimethyl uric acid, is formed from β-mono-methyl uric acid, and as it yields methyl-parabanic acid when oxidized and sarcosin (methyl glycocine) when hydrolysed, it is concluded that the second methyl group has been substituted in place of the H-atom at 3. The other dimethyl uric acid (α) when oxidized yields methyl-alloxan and methyl-urea, which indicates that a methyl group has been introduced into each of the urea residues. This combined with the fact that glycocine is obtained by hydrolysis shows that the two groups have been substituted at 1 or 2 and at 4. By similar means the constitution of the derivatives of the methyl uric acids has been proved. Professor FISCHER has previously investigated the chemical nature of xanthine ($C_5H_4N_4O_2$), a substance which occurs in many parts of the animal body, and of which the alkaloids of chocolate, tea and coffee, theobromine ($C_7H_8N_4O_2$) and caffeine ($C_8H_{10}N_4O_2$),

are the methyl derivatives. The relation of these bodies to uric acid is exhibited in the following rational formulæ:—



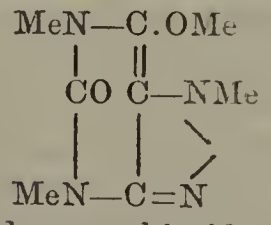
Xanthine.

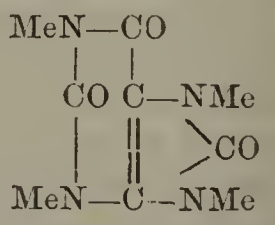


Theobromine.

By substituting one methyl group for the H-atom in the imidogen of theobromine, caffeine is obtained. The intimate connection of these alkaloids with uric acid had long been suspected on account of the similarity of many of their reactions, notably the action of ammonia on their oxidation products by which the well-known purple colour is more or less vividly developed. Then again, the empirical formula of xanthine differs from that of uric acid only in containing one atom of oxygen less. Indeed, STRECKER asserted that one of his pupils had succeeded in converting uric acid into xanthine by the reducing action of the hydrogen from sodium amalgam and water. Professor FISCHER, however, has experimentally shown that this reaction is non-existent and that neither can xanthine be obtained from uric acid by simple reduction nor uric acid from xanthine by simple oxidation. This is precisely in accordance with the rational formulæ which indicate that the relative difference between the two compounds is a radical one and not expressed by the mere loss or gain of an oxygen atom or hydroxyl group, but that the conversion of the one into the other would involve the change of a CH group into a CO group and at the same time the replacement of a nitrogen atom by imidogen and *vice versâ*.

By inspecting the formulæ of xanthine and uric acid it will be seen that substitution might be so effected in each of these molecules as to yield derivatives that stand in isomeric relation to one another. Thus Professor FISCHER has found that methoxycaffeine is isomeric with tetramethyluric acid. Their behaviour is accounted for by the rational formulæ—





Hydrogen chloride readily acts on methoxycaffein; an atom of hydrogen enters the methoxyl (OMe) group, replacing methyl, which escapes as methyl chloride while hydroxycaffein remains. The isomeride tetramethyluric acid is only with difficulty attacked by hydrogen chloride, and then indirectly through hydrolysis, when the molecule is entirely broken down with formation of carbon dioxide, methylamine and sarcosin. These reactions are symbolized in the above formulæ. The physiological connection of these alkaloids with uric acid has yet to be established. Enough has now been said to indicate the drift of Professor FISCHER'S work, but the original papers should be carefully read by all students of chemistry, for apart from the inherent interest of their subject-matter they exhibit in an eminent degree the methods of modern organic chemistry.

A copy of the number of the *Pharmaceutical Journal* for the 15th inst., containing a report of the proceedings in Edinburgh in connection with the opening of the Society's new house in York Place, has been sent to every registered chemist and druggist resident in Scotland.

* * *

In the report (before p. 397) of the speech of the President of the Pharmaceutical Society last week at the Dinner of Scottish Pharmacists, the phrase "the Pharmaceutical Society was not a *training* body" occurs erroneously for "the Pharmaceutical Society was not a *trading* body."

* * *

On Wednesday last, the Annual Conversazione of the Chemists' Assistants' Association was held at St. James's Hall, and was as on previous occasions a great success. The rooms were thronged with members and their friends, there being upwards of three hundred ladies and gentlemen present, Mr. S. R. Atkins, of Salisbury, and several prominent pharmacists being amongst the guests. After the reception an exceedingly attractive programme of instrumental and vocal music was rendered by the members, aided by several talented artists. A large number of microscopes, electric apparatus and rare chemicals were exhibited in the upper banqueting rooms, under the management of Mr. J. O. Braithwaite, and proved very interesting to the company. At the conclusion of the musical programme, a departure from the usual custom of the Conversazione took place by the announcement of dancing from 11 until 1. Evidently this new feature of the Conversazione was very attractive, as most of the guests remained until the close of the entertainment.

* * *

The trial of the Canadian drug clerk who was committed on a charge of having caused death by the substitution of gelsemium root for rue, which was kept in the same drawer (see before, pp. 71, 207), has resulted in an acquittal. The medical evidence produced was suggestive, to say the least, that a knowledge of materia medica is not a strong feature in the acquirements of the profession in the Dominion, since some of the witnesses admitted that previous to this case they had been ignorant as to the poisonous qualities of gelsemium. One witness said that he had for five years lectured on materia medica in a medical school and had never mentioned gelsemium in his lectures, nor had he known it to be used in the form of the root. In view of these admissions the judge told the jury that the ignorance of the prisoner respecting a drug about which doctors knew so little was excusable and culpable negligence had not been proved. The jury endorsed this opinion by a verdict of acquittal without leaving the box.

* * *

Another case of poisoning by gelsemium is reported in the *Canadian Pharmaceutical Journal*, which, however, was not fatal. It occurred to an assistant who, while drawing over some liquid extract of the root from one vessel to another by means of a siphon, got some of the liquor into his

mouth and swallowed a small portion. Two hours and a half afterwards dizziness and prostration became manifest, followed by other symptoms of gelsemium poisoning. Medical assistance having been called in, tincture of nux vomica, in a seven and a half minim dose, with a tablespoonful of brandy, was administered hourly, until twelve doses had been taken, under which treatment the patient recovered. Morphia, which is reputed to be an antidote to gelsemium, was not tried.

* * *

In a report recently presented to the Philadelphia Water Department, Professor A. R. Leeds mentions an interesting experiment in connection with water purification. The water supply of the town of Hoboken is taken from the river Hackensack, which stream is, however, so small and sluggish that the water is insufficiently aerated to keep down oscillarial and similar growths, which at times become so excessive as to render it quite undrinkable. Such a contingency having arisen in July last, the engineer caused air to be forced in at the pumping station and brought into contact with the water in the main under a pressure of a water-lift of 180 feet. Under this treatment the green tinge that had begun to develop in the reservoir disappeared entirely in forty-eight hours and the water, which had previously been bitter and nauseous, became colourless, sweet tasting and sparkling in appearance. The process of oxygenation under pressure is therefore to be a permanent feature of the Hoboken water supply, and Professor Leeds proposes that it shall extended to the water taken from the Schuylkill river for use in Philadelphia.

* * *

The recent attempt to introduce the cochineal insect from Algeria into the Madras Presidency has resulted in total failure, the whole of the insects having died. It has been suggested that this was due to the insects having been weakened through their importation during the hot months, and the Government has resolved to experiment further by introducing the insects during the cold season. In the meantime a garden of cactus plants is to be prepared upon which the insects may feed.

* * *

The literature of percolators and percolation is fairly extensive, but one of the latest contributions descriptive of a new form of percolator is probably unique. The writer modestly announces that "extraction by former methods of parallel or convergent roads of displacement is now superseded in radiate percolation, by the scintillation of the diffusive solvent fluids to the periphery of a sphere," and that "medical herbs, roots, barks, leaves, flowers and fruits yield, with divine homage, their aromatic, vital, curative potencies to the magic power by the Vacuum-Press Percolator." In conclusion, the writer proclaims to the world his "discovery of natural law of vacuum-press elastic transmission of normal atmospheric equilibrium activity."

* * *

During the last four years the export of essential oil of citronella from Ceylon has risen from 1,760,677 ounces to 4,827,020 ounces, of which latter 2,115,671 ounces came to Great Great Britain and 2,515,014 ounces went to America. Oil of cinnamon exports also increased from 41,719 ounces to 104,185 ounces, 71,945 ounces of which came to this country and 21,600 ounces went to America.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A general meeting of the above associati°n was held in the Society's room, Carver Street, on Wednesday evening, November 12, Mr. Preston, the President, in the chair.

The minutes of the previous meeting having been read, the Secretary placed upon the table specimens of true and false cubebs and a sample of gamboge in tears.

A paper was read by Mr. B. W. Wood, F.R.M.S., on "Starches," which was illustrated by microscopical specimens.

A very hearty vote of thanks was awarded Mr. Wood, on the motion of Mr. Ward, seconded by Mr. Newsholme.

During the evening the following donations were announced:—From Mr. Wood, the whole of the specimens of mounted starches illustrating his paper; from Mr. Grierson, mounted specimens of indigenous medicinal plants; from Mr. Newsholme, a set of preparations illustrating the pharmacy of the pharmacopœias and Muter's 'Materia Medica.'

LIVERPOOL CHEMISTS' ASSOCIATION.

The third general meeting of the thirty-fifth session of the Liverpool Chemists' Association was held at the Royal Institution, on Thursday evening, November 6, Mr. Edward Davies, F.C.S., F.I.C., President, in the chair.

The minutes of the previous meeting having been confirmed, and the donations to the Library announced, the President called upon Mr. J. S. Ward to read the following paper:—

Guaiacum Resin.

BY J. S. WARD.

When I first selected guaiacum resin as the subject of my paper to be read before you this evening, it was my intention to first give a brief *résumé* of its history, botanical and geographical sources, modes of collection, the varieties under which it occurs and the extent to which it is used; then to place before you the results of a preliminary analysis, and lastly to make a more complete analysis of some typical specimen with the object of discovering, if possible, some method of separating and estimating quantitativcly the substances that make up this complex resin. Such was my purpose; but I soon discovered that it involvcd far more time and labour than I have at the present at my disposal, and I therefore resolved to dividc the subject into two papers—the first of which I have the honour of bringing before your notice to-night, in the following order:

(*a*) *History.*—This resin was known as early as the year 1510 to Hutten, who discovered that when the wood was burnt, a black resin exudcd, which soon concreted; but it does not seem to havc been introduced into medicine before the middle of the 17th century. 'Pharmacographia' states that it is first mentioned in the first edition of the London Pharmacopœia in the year 1677. The wood, however, was uscd in medicine long before this time. Pereira (second edition) states that it was first imported into Europe about the year 1508 by one Gonsalvo Ferrand, and was for some time sold by him for seven gold crowns per pound, and Messrs Stephenson and Churchill, in their 'Medical Botany,' published in 1829, state that according to some manuscripts of Sir Hans Sloane which are preserved in the British Museum, the guaiacum plant was cultivated in this country as early as 1699 by the Duchess of Beaufort.

(*b*) *Botanical and Geographical Sources.*—It is yielded by two species of guaiacum, viz., *Guaiacum officinale* and *Guaiacum sanctum*, both of the natural order Zygophyllaceæ and natives of the West Indian Islands; the former constitutes the lignum vitæ of Jamaica, and affords most of the resin of commercc, whilst the latter is the lignum

vitæ of the Bahamas, and probably supplies the variety in tears.

(*c*) *Modes of Collection.*—It is produced by three methods.

(1st) Natural Exudation. Sometimes the exudation is accelerated by making incisions in the trunk—an operation that is performed, according to Pereira, about the month of May.

(2nd) By dry heat, which is performed by cutting the wood into logs about three feet long, boring a hole in them lengthwise, and placing them in a sloping direction over a fire; as the wood burns the resin fuses and flows along the bore into vessels placed to receive it.

(3rd) By boiling the wood, in chips, with water to which salt has been added to raise the boiling point; the resin floats to the top and is skimmed off.

(*d*) *Varieties.*—It occurs in two forms, tears and masses, constituting respectively guaiacum in lachrymis and guaiacum in massis. The latter only is usually found in commerce, and is most likely obtained chiefly by the dry heat process, whilst the former is most probably produced by natural exudation, chiefly from *Guaiacum sanctum*, as aforesaid.

(*e*) *Commerce.*—'Pharmacographia' states that in the year 1875, 36,350 lbs. were exported from Port au Prince.

(*f*) *Preliminary Analysis.*—For this purpose three specimens obtained from different sources were taken. No. 1. A sample of guaiacum in tears kindly sent to me two or three years ago by Messrs. Barron, Harvey and Co., of London, as a specimen. No. 2. A sample of the best commercial guaiacum in mass, purchased from Messrs. Evans, Sons, and Co., of this city, in the ordinary course of business. No. 3. The remainder of the specimens of old guaiacum resin that I had the pleasure of bringing before your notice at a previous meeting.

The course adopted was first to ascertain the proportion of each soluble in the following menstrua, viz., petroleum spirit, rectified spirit 60 o.p., ether, B.P., and water; then to take the specific gravity and estimate the amount of moisture and ash in each.

The method adopted in estimating the quantity soluble in the menstruum was the same in each case, and consisted in exhausting a given quantity with the solvent, filtering, evaporating the filtrate to dryness, and drying the residue in a hot-air bath at from 90 to 100° C., until the weight remained constant, and in each case checking the result by collecting the insoluble portion on a weighed filter paper, drying it as in the other case until the weight remained constant, and having ascertained its weight adding it to the weight of extract. In every case the total agreed very closely with the quantity originally taken, and the mean of the two weighings was accepted. The moisture was estimated by subjecting a given quantity to a hot-air bath (90 to 100° C.) until the weight remained constant, and then calculating the loss, and the amount of ash was ascertained by transferring this to a crucible and igniting until the carbonaceous matter was entirely burnt off, and the weight remained constant. This operation was a very tedious one, and it took several hours for the complete ignition of the last traces of organic matter. The ash of No. 3 is so much in excess of the two former that I think it must be contaminated with about 5 per cent. of earthy matter, and I shall refer to this point again further on.

The results obtained thus far are best shown in the following table:—

	S. V. R. 60 o.p. dissolved	Ether, B.P. dissolved	Water dissolved	Specific gravity.	Moisture.	Ash.
	p. c.	p. c.	p. c.			
No. 1. .	96·22	88·89	3·00	2·30	·587	·299
No. 2. .	92·96	89·91	3·23	2·28	·688	·334
No. 3. .	87·28	84·12	4·66	2·40	1·965	6·55

The petroleum spirit had no solvent action upon either sample.

The spirituous, ethereal, and water extracts, and also the ashes, were then respectively examined.

The spirituous extracts were taken first, and were subjected to the solvent action of rectified spirit 60 o.p., ether, chloroform, glacial acetic acid, liquor potassæ, and liquor ammoniæ fort., with results as follows:—They were entirely soluble in the rectified spirit, the glacial acetic acid and liquor potassæ; very nearly so in the ether; but only partially soluble in the chloroform and in the liquor ammoniæ. The portions insoluble in choloroform were of a pale yellow and somewhat flaky, whilst the portions insoluble in liquor ammoniæ formed quite a sticky mass, also of a pale-yellow colour.

These insoluble portions were separated by filtration, and the filtrates, as well as the alcoholic, ethereal and potassic solutions, were tested with chlorine water, bromine water, nitric acid, strong and dilute, a mixture of red chromate of potash and sulphuric acid, and fresh slices of potato, and the following colour reactions were obtained with the solutions of all three samples. Chlorine water gave a blue colour which remained permanent for some time; bromine water gave a similar reaction, but I think the blue was somewhat more intense. Nitric acid (strong) gave a blue colour rapidly becoming brown; dilute HNO_3 gave a green colour, gradually changing to blue and ultimately brown, but only assuming the brown colour very slowly.

The bichromate of potash and sulphuric acid appeared to act very energetically and gave a deep green colour which changed almost immediately to dark brown.

With the slices of potato a fine blue colour was developed after being exposed for some little time, but this reaction only took place with spirituous solutions. The same extract dissolved in either ether or chloroform failed to produce the colour, probably on account of the incompatibility of these solvents with the gluten.

The portions insoluble in chloroform were collected on a filter, washed with more chloroform, dried, dissolved in rectified spirit, and tested with the ordinary agents. In each case only very faint colour reaction was obtained, and the portion insoluble in liquor ammoniæ treated by the same method failed to give any colour reaction with these agents, thus indicating that the substance that affords these changes of colour is soluble in all the solvents employed.

The ethereal extracts were then tried with the same solvents, and as is shown in the accompanying tables they behaved very similarly to the spirituous extracts, and when treated with the various oxidizing agents they gave exactly the same colour reactions.

So far there is one thing worth noting, and that is that s. v. r. dissolves more of the resin than ether does, and yet at the same time ether takes up something that is not entirely soluble in spirit. Another point worthy of notice is that in every case the potassic and ammonia solutions remained perfectly clear and bright when largely diluted with water, which proved the absence of any common resin as an adulterant.

The watery extracts were next dealt with. Nos. 1 and 2 were of a pale yellow colour, whilst No. 3 had a brownish appearance. After drying and weighing they were redissolved in distilled water, and tested with solutions of plumbic acetate, baric chloride, calcic chloride, and ammonic oxalate, also with the oxidizing agents. The solutions from all three samples gave very similar reactions, which were, a gelatinous precipitate with the $Pb2\,C_2H_3O_2$, indicating the presence of a gum, and at the same time showing that it was not arabin. With $BaCl_2$ they gave very slight precipitates insoluble in dilute HNO_3, and which were evidently due to the presence of traces of sulphate.

With $CaCl_2$ they gave no precipitate, thereby proving the absence of phosphates and oxalates.

With $Am_2C_2O_4$ they gave copious precipitates which

were insoluble in acetic acid but readily soluble in hydrochloric, clearly indicating the presence in considerable quantities of calcium, which I have every reason to think constitutes the basic portion of the gum found.

I was altogether unable to detect either sodium or potassium, even in traces.

The oxidizing agents gave but very faint colour reactions with Nos. 1 and 2, and absolutely none with No. 3.

The following tables will best show the reactions obtained with all three extracts :—

Spirituous extracts.	In rectified spirit.	Ether, B.P.	Chloroform.	Glacial acetic acid.	Liquor potassæ.	Liquor ammoniæ.
No. 1.	Soluble	Nearly soluble.	Partly soluble.	Soluble	Soluble	Partly soluble
No. 2.	Soluble	Not quite so soluble as No. 1.	Partly soluble.	Soluble	Soluble	Partly soluble
No. 3.	Soluble	About as soluble as No. 2.	Not quite so soluble as Nos. 1 and 2.	Soluble	Soluble	Partly soluble

Ethereal extract.	S. V. R.	Ether.	Chloroform.	Glacial acetic acid.	Liquor potassæ.	Liquor ammoniæ
No. 1	Nearly soluble	Soluble	Partly soluble	Soluble	Soluble	Partly soluble
No. 2	Nearly soluble	Soluble	Partly soluble	Soluble	Solulbe	Partly soluble
No. 3	Not quite so soluble	Soluble	More nearly soluble	Partly soluble	Partly soluble	Partly soluble

Watery extracts	With Pb. $2C_2H_3O_2$.	$BaCl_2$.	$CaCl_2$.	$Am_2C_2O_4$	Oxidizing agents.
No. 1	Gelatinous precipitate	Very slight precipitate	No precipitate	A fair precipitate	Veryfaint colour reactions
No. 2	Gelatinous precipitate	Slight precipitate	No precipitate	A good precipitate	Like No. 1.
No. 3	Gelatinous precipitate (more copious)	Slight precipitate	No precipitate	Copious precipitate	No colour reactions.

Ash.	Soluble in H_2O.	Soluble in HCl.	Insoluble.
No. 2	Calcic sulphate	Calcic carbonate	Silica
No. 3	Calcic sulphate (very little)	Calcic carbonate, ferric oxide and aluminic oxide.	Silica and alumina.

The ashes from samples Nos. 2 and 3 were then subjected to a qualitative analysis (No. 1 was unfortunately lost, and considering that this was only a preliminary report, and that I was much pushed for time, I did not take the trouble to ignite another quantity; but I have reason to believe from their general analogies that the ash from No. 1 would closely agree with that from No. 2). The method adopted was the same in each case, viz., to treat the substance with water, filter and test the filtrate for both bases and acids. The insoluble portion was then boiled with dilute HCl, and again filtered, as it did not all dissolve. The filtrate was tested for acids and bases, and the insoluble portion after well washing was boiled with a strong solution of sodic hydrate, and it practically all dissolved, although in the case of No. 3 it proved very obstinate. This sodic solution was evaporated to dryness, acidified with HCl, and treated with distilled water; in each case a distinct precipitate of SiO_2 was obtained, especially abundant in No. 3.

The results, as shown in the table, indicate (1st) that the ash from No. 2 consisted almost entirely of calcium, and that it was mostly in the form of carbonate, evidently formed by the combustion of organic compounds of that base, which would appear from the analysis of the aqueous extract to form the gummy portion soluble in water; (2nd) that the ash of No. 3 contained, in addition to the calcic carbonate and sulphate, both iron and aluminium, as well as a larger proportion of silica; and I think fully bear out what was suggested earlier on, viz., that sample No. 3 was contaminated with about 5 per cent. of earthy matter.

The President said the Association was indebted to Mr. Ward for a most interesting paper, and one of a thoroughly practical character. It was a difficult matter to separate the organic bodies, and it seemed to him that the analytical operations of Mr. Ward had been most carefully worked out. His own experience led him to believe that as regards burning off the organic bodies it was almost impossible in the ordinary way with a Bunsen burner; but with a muffle this could be done, and at a very much lower temperature, with much saving of time and also of the platinum.

Mr. A. C. Abraham, in proposing a vote of thanks, said that the paper was a valuable one to pharmacists, as very little was really known as to the nature of guaiacum resin. He considered Mr. Ward's method of analysis by the different solvents used an admirable one. He would suggest that absolute ether be used instead of the ether of the B.P. He found that after making tinct. guaiaci ammon. a considerable separation took place, and would like Mr. Ward's explanation of this.

Mr. Conroy seconded the vote of thanks, which was carried by acclamation, and Mr. Ward having briefly replied the proceedings terminated.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

One of the most successful meetings of this Association was held on Tuesday, November 11, the President, Mr. A. E. Martin, occupying the chair.

After the Secretary, Mr. C. G. Wood, had read the minutes of the previous meeting,

The President called upon Mr. F. Wilson, of Rochdale, to read a paper on "Commercial Fixed Oils."

Mr. Wilson commenced by giving a definition of a "fixed oil" in the following words:—"By a fixed oil we understand one which does not sensibly evaporate at the ordinary temperature and which does not distil at the temperature of boiling water. Such oils have only a faint odour, similar to that of the substance from which they have been obtained." He then proceeded to describe the sources, mode of extraction, peculiarities, uses, etc., of the common fixed oils, commencing with almond oil, and speaking of others in alphabetical order. Speaking of cotton seed oil, he stated that it was obtained from the seeds of *Gossypium herbaceum*. The utilization of this oil is assuming or has assumed the importance of a distinct industry in the United States, where there are upwards of seventy oil mills. The quantity of seed treated for its oil amounts to over 400,000 tons annually. Its extraction is conducted as follows:—The seeds as they come into the mill still have a large proportion of fibre attached, which has a tendency to accumulate in masses; they are therefore thrown into a machine containing a revolv

ing screen-knife; they are next screened, afterwards decorticated, and then taken through one or more separators, which pass the kernels but retain the shells. The kernels are pressed into cakes between iron rollers and are then placed in steam-jacketed iron tanks, where by constant stirring and by the action of dry heat the oil is liberated from the cells in the course of about five minutes. The heated mass is then filled into sacks, and subjected to repeated hydraulic pressure till most of the oil is extracted. In the South of France large quantities of it are used by soap makers in combination with other oils and fats. After mentioning the source, use, etc., of colza oil, the essayist noticed chaulmoogra oil, saying, this oil is official in the Indian Pharmacopœia and is obtained from *Gynocardia odorata*. The seeds of this plant, which ripen in December, are collected, dried and sent to Calcutta, where the outer integument of the seed is removed and the kernels pressed between iron rollers. Another method consists in treating the kernels with ether; this method affords over 50 per cent. of fatty oil, a peculiarity of which is its indestructible green colour. The expressed oil concretes at 62° F., whilst that extracted by ether or bisulphide of carbon requires a lower temperature. This oil is largely used in the form of ointment and soap as a remedy for rheumatism. Croton oil was next spoken of, after which dugong, earth nut, linseed, mustard, neatsfoot, olive and others. Mr. Wilson stated that sesame oil is obtained from a plant indigenous to India, the botanical name of which is *Sesamum Indicum*. The plant comes to perfection in three or four months. The fruit is a capsule containing numerous seeds. To collect the seeds the plant, when mature, is cut down and stacked in heaps for a few days, after which it is exposed to the sun during the day but stacked up again at night. The plant is found in several varieties, affording respectively white, yellowish and reddish-brown seeds. The dark seeds may be deprived of a part of their colouring matter by washing, which is sometimes done with a view of producing a paler oil. From the yellowish seeds 56 per cent. of oil may be obtained. The best kinds of sesame oil have a mild agreeable taste, a light yellowish colour and scarcely any odour. When of fine quality it is one of the least alterable oils. It is obtained by expression and by ether; commercial oil is prepared by expression. In composition it is a mixture of olein, stearin and other compounds of glycerine with acids of the fatty series. The small proportion of solid matter which separates from the oil on congelation cannot be removed by pressure. In this respect sesame oil differs from olive oil. If this oil be shaken up with a mixture of nitric acid and sulphuric acid, it assumes a fine green hue, a reaction which no other oil exhibits. Good sesame oil is substituted without disadvantage for ol. olivæ, and as its congealing point is some degrees below that of olive oil it is more suited to cold climates.

After the reading of the paper, a discussion took place in which Messrs. Martin, Whitworth, Swinbourne, Lees and Wood took part. Mr. Martin also spoke to some length on the "Oleates," speaking of their use and advantage over many ointments, and expressed his opinion that they would become an important series of remedies in the future.

Mr. Whitworth proposed a vote of thanks, which was seconded by Mr. J. Lees in a few appropriate remarks, and carried unanimously.

Mr. Wilson having replied and accepted the vote, the proceedings terminated.

HALIFAX CHEMISTS' ASSOCIATION.

The annual dinner of this Association was held at the Masonic Hall, on November 13, under the Presidency of Mr. William Dyer.

Representatives of the Halifax Drapers' and Grocers' Associations were present, and a very enjoyable evening was spent.

At the annual meeting, held previously, the Secretary, Mr. J. B. Brierley, read a brief report of the year's proceedings, and the Treasurer, Mr. Councillor Jessop, presented his report, showing a balance in hand. The Librarian, Mr. Robert Brook, then stated that the books were in good condition, but he regretted to say that the library was not used by those for whose benefit it was originated, viz., the assistants and apprentices of the town and district, not a single volume having been applied for by either class during the past year.

Mr. Brierley then proposed, and Mr. Dyer seconded, a hearty vote of thanks to Mr. Benjamin Shaw for his valuable services as President, for the fourth time, during the past year.

Mr. Shaw suitably responded and proposed votes of thanks to the Treasurer, Librarian and Secretary.

The following officers, for the ensuing year, were elected: — President, Mr. William Dyer; Vice-President, Mr. B. Shaw; Treasurer, Mr. Councillor Jessop; Librarian, Mr. Robert Brook; Secretary, Mr. J. B. Brierley.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The first meeting for the present session was held on Thursday, November 13, the President, Professor Attfield, F.R.S., in the chair, forty-two members being present.

The election of officers was proceeded with in the usual manner, Messrs. R. E. Nicholls and R. Roberts being appointed Scrutineers. They announced that for Vice-Presidents, Mr. Dymond had received eighteen votes and Messrs. Ince and Braithwaite seventeen each; Mr. F. W, Short had been elected Secretary; Mr. E. J. Eastes. Assistant Secretary; and Messrs. E. Cullinan, E. H. Barritt, E. Terry and R. Potts to the Executive Committee. Messrs. Ince and Braithwaite having each received the same number of votes for the Vice-Presidency, the matter was postponed in order that a meeting of the Executive Committee might be held to settle it.

The President having made some remarks explanatory of the objects of the Association, during the counting of the votes,—Mr. R. W. Giles then delivered an Introductory Address, in which he defined the purpose of the School of Pharmacy Students' Association as being supplementary to the ordinary teaching curriculum of the School, supplying a deficiency to which all education is more or less liable. He said there was a danger of education obliterating to some extent the faculty of observation by the very completeness of the information that it supplied to its alumni, which had a tendency to diminish the necessity for personal observation. It was therefore necessary to stimulate that faculty lest it should languish for want of use. That was the real object of the Students' Association. Its ostensible aim was research, and although great discoveries could not be expected from students of their short standing, much benefit would accrue to them individually by prosecuting investigations into questions which might present themselves in connection with their work in the laboratory, or which might come before them in any other way. Other subjects not strictly coming under the head of research were indicated which would afford interesting and profitable matter for the evening meetings if diligently worked out. The obligation of taking an active part in the discussions which follow the reading of papers was also pressed upon the members as advantageous to themselves and contributing to the general interest. These exercises would advance their immediate object of qualifying the students for the examinations which they must pass, and still more, would qualify them for the serious duties of after-life. He begged them not to forget their *alma mater* in Bloomsbury

Square when their probationary period was over, but urged them to keep up a loyal connection with the School and with the Society, and concluded by coupling the advice given to the Association at the opening of its previous session with the forcible words of the giver of the first sessional address "to be cheerful," and "to be thorough," "and to be cheerful that they might be thorough, and so with most satisfaction to themselves they would turn out the best work of which their faculties were capable. It might not be *great work* measured by the standard of greater men, but it would be the full fruition of the one or two, or more talents, committed to their keeping—the vigorous outcome of *mens sana in corpore sano*."

A vote of thanks to Mr. Giles was proposed by the President, seconded by Mr. H. G. Greenish, and carried unanimously.

To the foregoing, which represents the usual proceedings of the Association, was added a new feature in the presentation of an illuminated address to Mr. W. R. Dunstan.

The President related the circumstances which gave rise to the address, and called on members to express the opinions of the Association and the School on the subject.

Mr. Giles, speaking for the Association, said he had very great pleasure in expressing their high appreciation of the exceptional talents and ability of Mr. Dunstan, and thought that the compliment the students had shown him to-night would be reflected back as an honour to themselves. Mr. Dunstan had the sincerest good wishes of all with whom he had been associated.

Mr. Dymond, on behalf of the students in the School, spoke in the highest terms of the esteem and respect in which Mr. Dunstan was held among them, his advice and encouragement being invaluable.

After reading letters from the President of the Pharmaceutical Society, Professors Redwood, Bentley, and others, expressing regret at their inability to be present, Professor Attfield bore testimony to Mr. Dunstan's great powers of organization which he had displayed as Secretary to the Association. He could not speak too highly of his work in the laboratory as Senior Demonstrator, the duties of which post he had performed to perfection.

The words of the address were as follows:—

"We, past and present students of the School of Pharmacy and members of the Students' Association, desire, on the occasion of your relinquishing a portion of your duties here, to congratulate you on your appointment to the University of Oxford, and, at the same time, to express our regret at losing your valuable services. As students, we have a high appreciation of your ability as Demonstrator, and of your unvarying kindness and consideration. As members of the School of Pharmacy Students' Association, we wish to record our sense of the admirable manner in which you have conducted the affairs of that Association.

"May you be successful in the path of life which you have chosen, and may the few years which you have spent amongst us be but the commencement of a long career of usefulness."

The list of signatures at the bottom was too long to be read out, there being about one hundred names.

Mr. Dunstan, in responding, expressed himself deeply indebted for this acknowledgment of his services. He considered the esteem and gratitude of his pupils to be a teacher's highest reward. The Students' Association he had always looked upon as a part of the School, and it had been a task of great pleasure to him to assist its development to the best of his power. Although he could no longer be present at the meetings he should continue to take great interest in the welfare of the Association.

The meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting held October 29, at 103, Great Russell Street, Mr. Winfrey, President, occupied the chair and forty-six members were present. Previous minutes were read and confirmed and one new member proposed and seconded.

Mr. Winfrey then called upon Mr. W. J. Frankish to read the following paper:—

The Chemistry of Digestion.

BY W. J. FRANKISH, M.R.C.S., L.R.C.P.

Although it is most probable that in this paper I shall not be able to present anything very new to many of you, yet I trust that at the end of it you may have clearer views of an important act of our economy, viz: digestion, than at present, even if that result be only brought about by refreshing your memories, or arranging facts in a different manner to that in which they may have been presented to you hitherto.

How common it is to hear from our friends or acquaintances, especially those who are approaching the middle age, that they suffer from "indigestion," or that they are "bilious." So commonly indeed is this the case that we are apt to look upon the disordered condition as a very minor matter, and our poor friends who are sufferers from it we dismiss with feeble expressions of sympathy, and often register them in our thoughts as "grumblers" and persons not to be encouraged in the unfortunate habit of dwelling upon the sensations which arise from their wretched stomachs.

It is perhaps but natural that we, who might be able to digest an "uncooked half-brick" if put to the test, should not be able to fully enter into the sensations of a dyspeptic, yet I can assure you that the wretchedness which arises from a disordered digestive apparatus is of a most pronounced character, and may, if continued sufficiently long, act upon the mental as well as the physical side of our lives. A better example of this, I think, could not be put forward than that of the "Bard of Chelsea," the late Thomas Carlyle. It is a known fact that he was a "chronic dyspeptic," and this unfortunate fact impressed itself upon his intellectual and moral nature, for if we take the general tone of his works, we shall find, throughout, a vein (often most prominent) of disgust and contempt of things in general—and frequently of men and institutions in particular.

I do not see how it could be otherwise, and I would ask, whether it would be possible to write a cheery document when in the terrors of sea-sickness and suffering from its effect on the mental condition. Yet this, in a mild form, was what Thomas Carlyle was suffering from during his whole life, and he became intellectually, morally and physically a dyspeptic.

With these few remarks, to show the importance of the act of digestion, and its influence on life when upset, I will now attempt to refresh your memories on the subject.

Before proceeding to speak of the act of digestion itself, it would be as well, perhaps, to draw your attention to the various organs concerned in the process.

The Mouth.—In the mouth the first process of digestion takes place, both on its "chemical" as well as its physical and mechanical side, for it is there that the salivary fluid is first brought into contact with our food, and it is there also that the food is prepared (or ought to be) for its reception into the stomach. I say ought to be, for it is a well-known fact that very many persons are subjects of dyspepsia, simply because they do not use their teeth sufficiently, or that they have no natural ones to use, and are too careless or lazy to apply to art to assist them. I believe it is a fact that the greatest man in England at the present time, Mr. Gladstone, has made a rule for himself to chew every mouthful of food a certain number of times (I forget how many, but certainly a great number) before swallowing it, and it is more than probable that to this little act is due, in a great measure, the

intellectual and physical strength of his long, laborious nd honourable life.

I will refer to the "salivary fluid" later.

The Stomach.—We next come to the stomach, which is a large hollow viscus, intervening between the small intestines and the gullet. In it the albuminous portion of our food is first acted upon, whereas in the mouth the starchy matters were alone acted upon. I mean chemically, for in the stomach as well as the mouth, the contents are moved about and mixed by the muscles of the walls of the organ. The fluid, as you well know, which is the potent factor in gastric or stomach digestion, is called the gastric juice, to which I will refer at more length.

Small Intestine.—We next come to the small intestine, the upper twelve inches of it called the *duodenum*. It is popularly supposed that when the food leaves the stomach that the digestive act is completed, and that we have only to lie down like pigs and feel comfortable. This is not so, however, as I shall presently show, for it is here in this part of the intestine that the *bile* and the "pancreatic juice" are brought to act upon our food, and to finally prepare it for the reception into the blood vessels and the lacteals.

It is convenient to call this part of digestion the *pancreatic digestion*, because the pancreatic fluid is the chief and most important factor in the process.

The Pancreas.—The gland which secretes this fluid lies behind the stomach, across the spinal column, and opens into the small intestine by a duct, called the "pancreatic duct."

The delicacy so often used and eaten as an *entrée* is usually the "pancreatic gland" of sheep, calves, etc., but it is in a cooked state of no use to us in assisting the digestion, for the ferment which it contains is destroyed by the heat during the process of cooking.

Small Intestines.—Below the duodenum the process of digestion goes on in the small intestines, and by the time the food reaches the end of these, there remains little more nutriment to be obtained, and the remnants of the feast are passed on into the large intestines, to eventually be extruded as fæces.

The Liver.—There is one other important gland concerned in the process of digestion, and that is the liver, but as it acts more as a storehouse for the food digested in the other organs I have mentioned than in the actual process of "primary digestion," I shall say little about it, merely mentioning here that its secretion the "bile" takes a small part in the process.

Secondary Digestion.—I have just said "primary digestion," and by that we mean that process which the food undergoes, by which it can enter the blood; in other words, that process which has changed solid constituents into liquid ones to enable them to pass through animal membranes, for digestion (primary) is only another word for "solution."

Secondary digestion is, however, another process by which the fluid elements of our food (which are carried to the liver by the portal vein) are changed again into solid matter and stored up in the liver again in that form for future use. Taking it broadly, we may look at primary digestion as a process of hydration, and secondary digestion as a process of dehydration. In the first act a chemical change takes place, by which one or more molecules of water are added, and in the second act (that which takes place within the liver) this water is again removed and the food stored up as *glycogen* or animal starch.

This glycogen or animal starch is well represented by that fawn-coloured mass which constitutes the dainty of the oyster. That is its liver, and is little else than a heap of glycogen. And while I am speaking of the oyster I may explain that the reason why oysters are so much more digestible in the raw state than when cooked is due to the circumstance that in connection with this glycogen is a special ferment or diastase.

During life this diastase is prevented from acting upon the glycogen, but as soon as the morsel is crushed between the teeth and warmed by the heat of our mouth and stomach these two bodies are brought together, and the glycogen is at once digested, without the help of our saliva or pancreatic juice, by its own diastase.

In fact, an oyster in an uncooked state, or merely warmed, is self-digestive.

Having briefly pointed out the organs and their secretions which have to do with the digestive process, I will now endeavour to enter a little more fully into the action of the various digestive juices.

Table of the Digestive Juices and their Ferments.

Digestive juices.	Ferments contained in them.	Action on food materials.
Saliva	Salivary diastase or ptyalin.	Changes starch into sugar and dextrine in an alkaline medium.
Gastric juice .	*a.* Pepsin	Changes proteids or albuminoids into peptones in an acid medium.
	b. Curdling ferment	Curdles the casein of milk.
Pancreatic juice	*a.* Trypsin . . .	Changes proteids into peptones in alkaline and neutral media.
	b. Curdling ferment	Curdles the casein of milk.
	c. Pancreatic diastase.	Changes starch into sugar and dextrine.
	d. Emulsive ferment.	Emulsifies and partially saponifies fats.
Bile	?	Assists in emulsifying fats.
Intestinal juice	*a.* Invertin . . .	Changes cane sugar into invert sugar.
	b. ? Curdling ferment	Curdles the casein of milk.

Just a few words, however, on the constituents of food.

Food of man consists broadly of three things, starch matters, albuminoid matters and fat in various forms, and it is of the digestion of these articles which I shall mainly occupy your attention.

The *starchy* constituents of our food probably consist of nearly two-thirds of the whole amount, and, therefore, play an important part in our life, and that of millions in the East who live chiefly upon rice. It is represented, as you are well aware, in the cereals, and leguminous plants, as well as the potato. As sago it is obtained from the pith of the palm, tapioca from the cassava, and arrowroot from other tubers.

Albuminoids, or Proteids enter the body as the flesh of various animals, the white of egg, and the gluten of vegetables with their albumen and legumin. Casein of milk is an important proteid.

Fats I need not say much about; they are divided into animal and vegetable, and broadly consist of fatty acids and glycerine.

Of course in our food there is a large amount of water, as well as salts of various kinds, admitted with food, but

the digestion and disposal of the latter I shall not dwell upon, merely remarking that chloride of sodium is decomposed within the body, the one part of which goes to the formation of the gastric juice, while the other, the soda, preserves and maintains the alkalinity of the blood.

The Saliva.—You will see by the table that the saliva contains a ferment called *Ptyalin*. The saliva is always alkaline during mastication, but the fluid of the mouth becomes acid and remains so until the next time of taking food, this acidity being due to mucous secretion. Besides water, mucus, with some alkaline and earthy salts, the saliva is remarkable for containing a minute quantity of sulphocyanide of potassium.

It is, however, with the ferment, or ptyalin, we have to do.

In the malting of barley the ferment within the grain changes the starch in the transformation into malt, just as it does in germination within the earth. This diastase pulls the starch granules (if I may say so) to pieces, and renders the insoluble starch soluble. Now the salivary ferment or diatase is identical in its properties with that of barley, and as soon as starchy matter is brought into contact with it, in the mouth, it acts upon it in the same manner, and the otherwise insoluble starch, when mixed with the saliva, becomes liquefied and soluble, by hydration. By adding one molecule of water, the starch is changed into maltose and grape sugar.

The saliva of man contains more of this diatasic power than that of any other animal. In the raw state starch is to man an almost indigestible substance, but when previously subjected to the operation of cooking it is digested with great facility, for cooking breaks the capsules of the starch grains and so prepares for the action of the ferment.

The action of saliva is easily seen on starch. If you make a little starch paste and put it into a test tube with some saliva, you will find that in a few minutes (four or five) the stiff paste becomes a watery liquid. At this moment the solution if tested with iodine will yield a pure starch reaction, but in a few minutes more you will find sugar by using Fehling's solution or other test.

It is in this state of solution as sugar only, that starch can enter the blood and serve as nutriment.

Fats and proteids are not acted upon by the saliva; it acts alone upon the starchy or amylaceous parts of our food. It will be seen by the table that this ptyalin only acts in an alkaline medium, so that when the starchy matters pass on into the stomach digestive action upon them ceases for the time.

Gastric Juice.—This, as no doubt you are aware, is secreted by the glands of the mucous or lining membrane of the stomach.

It is an excessively acid secretion, the acidity being due to hydrochloric acid. It also contains two ferments, pepsin and a "curdling ferment."

Now, when food enters the stomach, ths glands of the lining membrane begin to secrete and pour out this acid liquid, but as this takes some time, the saliva, which has been mixed with the food, has still some action on the starchy particles, but as soon as the contents of the stomach become acid the digestion of starch ceases and that of albuminoids commences.

The changes which albuminoids or proteids undergo during digestion are very imperfectly understood, but the main recent opinions converge towards the idea that the process is in the main one of progressive reduplication with hydration, similar in type to the transformation of starch by diastase.

The chief thing to bear in mind at any rate is that albuminoid matters when introduced into the stomach are not capable of entering the blood, but by the action of pepsin their chemical characters are altered and they are then able and do pass through the walls of the blood-vessels and enter the circulation.

When they have undergone this change they are termed *peptones*, and as such are carried to the liver by the portal vein. It is, however, at the present time difficult to trace them even so far, and some have gone so far as to say that they are not even to be traced in the circulation after they leave the stomach and intestines.

The primary function of the pepsin acid of the gastric juice is evidently to get the albuminoid matters into solution rather then peptonize them. Claude Bernard looked upon gastric digestion as a hasty preparatory process, introductory to the more perfect intestinal digestion.

The Milk Curdling Ferment.—You all know that one of the most striking properties of gastric juice is to curdle milk. This property is utilized on a large scale in the art of making cheese. Rennet, which has been used for that purpose from remote antiquity, is simply an infusion of the fourth stomach of the calf in brine.

This curdling of casein, by rennet, does not depend upon the acid of the gastric juice, for it takes place when the milk is neutral or faintly alkaline. Neither is it due to pepsin, as has been shown by Bruch.

It must therefore be regarded as a substance distinct from pepsin.

You will see by the table that this milk curdling element is also contained in the pancreatic juice and intestinal juice as well as in the gastric juice. They are not, however, quite the same, for while gastric rennet will produce curdling in milk neutral or even faintly alkaline, it will not do so if the alkalescence produced exceed that of 1 grain of sodæ bicarb. to an ounce of milk; with pancreatic rennet, however, you may add 3 or 4 grains of sodæ bicarb. to each ounce of milk, and it will still produce curdling with undiminished energy.

This ferment is a true one; that it is not some inorganic chemical agent is proved by the fact that boiling or even heating to 160° F. instantly destroys its power.

It is a curious fact that this milk curdling agent is found in the stomach and pancreas of the fowl. Yet although we have all heard of pigeons' milk, I am not aware that any has been found, and "sucking dove" is a fiction of a similar nature.

Pancreatic Digestion.—When the food leaves the stomach it is termed *chyme*, and is an acid liquid. It now comes into contact with two other juices, the pancreatic and liver juice, or bile.

Again referring to the table, it will be seen that the pancreatic juice contains four ferments, trypsin, curdling ferment, pancreatic diastase and emulsive ferment. It will be seen also that trypsin is very much like pepsin in its behaviour, inasmuch as it attacks the proteid elements of the food, but with this difference, that it acts upon them only in alkaline or neutral media.

Again, you will observe that the pancreatic diastase is very similar to ptyalin, the ferment of the saliva, and acts on the starchy matters which have escaped action by the latter and changes them into maltose and grape sugar, for you will remember that all digestive action on starch ceased in the stomach.

Thirdly, there is the milk curdling element found in the pancreatic juice, similar in nature to that found in the stomach.

Lastly, we find an element, which has an action on fats. You will possibly have noticed that fats have not hitherto been acted upon, but as soon as they arrive in the duodenum they are brought into contact with this ferment, and the changes they undergo consist mainly in their reduction into a state of emulsion or division into infinitely minute particles.

A small portion, however, undergoes a chemical change, whereby the glycerine and fatty acids are dissociated. The fatty acids thus liberated then combine with the alkaline bases of the bile and pancreatic juice and form soaps.

The main change, however, is undoubtedly an emulsifying process, and in this state the fat is taken up by the lacteals or absorbents of the intestines.

We see, therefore, that in the small intestine the process of digestion is in a more active state than anywhere, for it is there that starch is again digested, the proteids acted upon by the trypsin, and fat is emulsionized, for, in addition to the emulsive ferment in the pancreatic juice, the bile by its alkalinity neutralizes the acid chyme which comes from the stomach and assists in the emulsifying process.

Finally, we come to the intestinal juice throughout the small intestine. This, it will be observed, besides containing a curdling ferment, has another, viz., invertin, which acts upon cane sugar so as to make it digestible.

Claude Bernard first called attention, I believe, to the fact that cane sugar cannot be digested in its ordinary state, but must undergo some transformation before it can be assimilated by animals, for when it is injected into the blood it circulates there as an inert body, and is in no degree used as nutriment by the tissues, but is eventually entirely removed unchanged by the urine. Cane sugar, however, is an important article of food, and consumed by us every day in large quantities, and we known that when thus consumed it does not behave like an inert matter, circulating in the blood and then eliminated by the kidneys as a waste product.

It is evidently absorbed and assimilated, and Bernard found, after a long search, that the ferment which changed it, and made it assimilable, was in the juice of the small intestine. It does not exist in the large intestines.

Just one or two words on the liver and the part it takes in digestion. We have seen that the starch is changed into sugar, and the proteids into peptones, and are carried away to the liver, there to undergo a process of dehydration and to be changed again into animal starch and proteids, and there is a reason for this, for otherwise in their soluble condition, if they were not changed back again and stored up, they would escape out of the blood as easily as they got into it. In certain individuals this is found, when the liver is unequal to the power of dehydrating or storing up the sugar of the portal vein, as glycogen. It then passes out by the kidneys as quickly as formed, giving rise to that disease termed diabetes. This state of things may be produced in anyone by excess of sugar, at once; only when pronounced does it constitute diabetes.

I have tried to show that the essential work of digestion is carried out by a group of agents called soluble or unorganized ferments. These are found dissolved in the various digestive juices or secretions formed in the alimentary canal, through which the food must pass. The physical and mechanical processes to which the food is subjected in the mouth and stomach are purely introductory or preparatory for the essential part of the digestion, viz., the action of these ferments.

I hope and trust that, at least, I have been partially successful in my task, for I feel that whatever misconception may arise among you, gentlemen, that it is to my want of ability and clearness in putting the subject before you, and not to your want of attention, which I beg most heartily to thank you for.

A ferment is a body which works changes in other substances, altering their chemical composition somewhat, *e.g.*, yeast, saliva, gastric and pancreatic juice.

Note.—To the substance of this paper I am greatly indebted to the works of Dr. Roberts, of Manchester.

In the discussion which followed, the President, Messrs. Braithwate, Burnett and Baily took part, and reference was made to the causes of sea sickness and bilious attacks, the quantity of food required by adults, the function of sulphocyanates in the saliva, the actions of several of the ferments mentioned; and opinions were expressed concerning pepsine, ingluvin, papaine, etc.

After Mr. Frankish had replied, Mr. Hartridge proposed, and Mr. Worsley seconded, a vote of thanks, which was carried by acclamation.

Review.

THE MEDICINE STAMP TAX.* Its Origin. Its Dangers. Its Injustice. Its Evil Tendencies. Its Indorsement of Quackery. Its Hardship on the Poor. By C. E. MEETKERKE.

We have already had occasion to animadvert upon various misleading statements that have been made with a show of authority in the public press recently upon the subject of the Medicine Stamp Act, and we regret to observe that in the *brochure* under notice some of the most objectionable of them are reiterated. Indeed it is difficult to conceive what object the author thought he could serve by rushing into print upon a subject about which—it is most charitable to assume—he knows so little. In justification of this remark we may instance a passage (p. 5) referring to the Act of 1812, in which a rather startling definition of a "patent" medicine is at least implied. The author says: "The final clause of this amended Act is sufficiently sweeping, for it includes 'all other pills, powders, lozenges, tinctures, potions, cordials, electuaries, plaisters, unguents, salves, ointments, drops, lotions, oils, spirits, medicated herbs and waters, chemical and official preparations whatsoever, to be used or applied externally or internally as medicines or medicaments, for the prevention and relief of any disorder or complaint incident to or in any way affecting the human body.'" A reference to the Schedule of the Act shows that the author has broken off his quotation in the middle of a sentence, ignoring the fact that the remainder of it specifies the conditions that are to render the foregoing articles liable to stamp duty. Neither here, nor in any other part of the pamphlet, so far as we have been able to observe, is there any intimation that the liability is dependent upon claims as to special rights in preparation or recommendations by advertisement or otherwise in respect to the relief of disease. It is not surprising after this to meet again with the misconception to which we recently referred as to foreign-manufactured alkaloids. Turning to another class of statements it would be interesting to know what data Mr. Meetkerke is in possession of that he feels warranted in saying that "One preparation [of the soothing syrup class] alone is the undoubted cause of death of 160,000 children annually." If this were capable of proof it would indeed have an important bearing in the discussion. There is no doubt much to be said in favour of some modification of the law relating to patent medicines, but arguments, even in the best of causes, require a foundation of facts. We do not find this condition fulfilled in Mr. Meetkerke's little *brochure*, and think any person desirous of acquiring correct information might preferably spend a few pence in the purchase of copies of the Acts and study them for himself.

* London: Wyman and Sons. 1884. Small 16mo. Pp. 1–24. 1*s*.

ANSWERS TO CORRESPONDENTS.

Prince.—There is no authoritative formula for such a preparation and the prescription is probably intended for a private formula.

Wilts.—It is not possible to say with certainty, but in the event of not being able to communicate with the prescriber "spt. chloroformi" might be dispensed in the one case and "pulv. tragac. co." in the other.

Kintyre.—Apply to the Secretary, Mr. Cresswell, Palace Chambers, 9, Bridge Street, Westminster.

C. Mark (who should have sent his address).—There is no law to prevent the supply of such articles to hucksters not holding a patent medicine licence, but the right of such persons to retail them would depend partly upon whether they came within the definition of "patent medicines."

S. P. S.—Dr. Smith's 'Smaller Latin Dictionary' (Murray), or Cassell's 'Latin Dictionary.'

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Crook, Bell, Darling, James, A Chemist, J. F.

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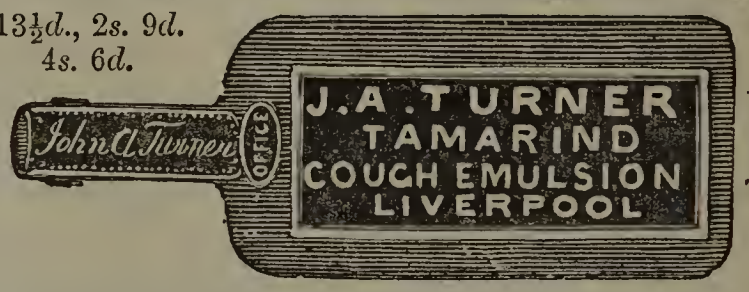

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WHOLESALE.—Advertiser seeks a situation in a Wholesale Drug house. Highest references. Age 27. CHEMICUS, 172, Fleet St., London, E.C.

AS DISPENSER or JUNIOR to Chemist. 6 years' country and 6 years' London experience. Age 25. Height 5ft. 10in. Out-door preferred. CHEMIST, 80, Commercial Rd., Newport, Mon.

AS ASSISTANT. Aged 25. Height 5ft. 6in. Mixed business. Town or country. 5 years' experience. Good reference. C. V., The Wharf, Shardlow, near Derby.

AS ASSISTANT in Retail and Dispensing business. 9 years' experience. Age 23. Disengaged. A. B. GUERIN, The Elms, St. Martin, Guernsey.

AS ASSISTANT or DISPENSER in London. Part or full time. Age 25. Height 5ft. 10in. ALPHA, 44, Trinity Sq., S.E.

ADVERTISER is seeking a situation, either Wholesale or Retail. Bloomsbury preferred. Married. 30 years of age. EDW. PARSONS, 59, Gt. Russell St., London, W.C.

WITH Surgeon or Chemist, London or Edinburgh, after 5 p.m. Age 24. Height 6ft. Thoroughly experienced. Can Extract Teeth. Board and residence. No salary. Mr. GEORGE, 3, Fitzalan Pl., Roath, Cardiff.

AS ASSISTANT. With part time and small salary. In London or suburbs. Age 27. Good experience. RHUBARB, 29, Foley St., Langham St., London, W.

BY a qualified ASSISTANT.—A situation of Trust, or to Manage a Branch. Knowledge of Photography. G. W., 6, Station Ter., Kilburn Rise, London, N.W.

AS ASSISTANT or DISPENSER to a Surgeon. Town or country. London experience. Ætat 30. T. M., 32, Alderney Rd., Mile End, E.

ENGAGEMENTS WANTED.

AS JUNIOR, in a good Dispensing business. Good references. Age 21. GEO. J. COOMBS, Jun., Hucknall-Torkard, Notts.

MR. MASON, Cranham St., Oxford, Chemist's Temporary MANAGER, is open to an engagement for 3 or 4 weeks. Terms reasonable. Good references from last employers. Telegrams promptly answered.

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LOCUM TENENS. Qualified. W. C. TAYLOR begs to state that he has removed from St. Stephen's Avenue to 6, Warbeck Rd., Shepherd's Bush. Please notice change of address.

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AS IMPROVER or TURNOVER. In London or country. Salary not so much an object as improvement. Would give the first fortnight. IMPROVER, 34, Bridge St., Cambridge.

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AS JUNIOR. In-door. In light Retail and Dispensing. Christian home preferred. Age 22. Height 5ft. 10in. Satisfactory references. State salary and usual particulars to A. HAY, Easton, near Stamford.

AS SENIOR or MANAGER, with view to Partnership or Succession. First-class experience. Good references. CHEMICUS, 65, Chalk Farm Rd., London, N.W.

BY Advertiser. Age 29. Married. Out-door. Wholesale or Retail, or Management of a Branch establishment, and live on premises. P. R. S., Messrs. Moore & Co., 45, Craven Rd., London, W.

BY an Assistant studying.—As LOCUM TENENS, or for 6 hours a day, for a month. Out-door. TIME, 98, Kensington High St.

FOR 2 or 3 evenings weekly (Tuesday and Saturday preferred). Competent Prescriber and Dispenser. Minor qualification. In or near East End. ALPHA, 5, Belgrave St., Stepney.

ASSISTANTS WANTED.

A JUNIOR ASSISTANT, having some knowledge of Dispensing. 3 kept. Address, giving age and experience, and enclosing photo. (to be returned), THOMAS PADWICK, The Pharmacy, Red Hill, Surrey.

A MAN with Chemical knowledge, accustomed to Laboratory work and the Manufacture of Soluble Flavouring Essences. State salary and full particulars, to X., care of Messrs. Mace & Haldane, 77 & 78, Milton St., E.C.

A COMPETENT out-door ASSISTANT, for a high class Dispensing business. Apply, with full particulars, enclosing carte. Also vacancy for an APPRENTICE. COUSINS, THOMAS & Co., Chemists, Oxford.

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IMPROVER or Junior ASSISTANT. Plenty of time allowed for study. One accustomed to a Mixed country trade. A. E. PRIDE, Old Basford, Notts.

ASSISTANTS WANTED.

SUSSEX County Hospital, Brighton, 12th November, 1884.—DISPENSER wanted. Written applications for the office, with testimonials as to character and qualifications, addressed to the undersigned at the Hospital, will be received by the Committee of Management on or before 11 o'clock a.m., on Wednesday, the 3rd day of December next. Candidates must be duly qualified Pharmaceutical Chemists, and will have to pass a vivâ voce examination of a practical nature. Salary £100 per annum, rising at the discretion of the Committee of Management to £120 per annum, and a meat luncheon, with beer, will be provided daily at 1 p.m. The Dispenser resides out of the Hospital, and is forbidden to make any engagements that may interfere with the interests of the Hospital. The person elected will have to join on or about the 10th December next. By order of the Committee of Management.
E. F. BOURCHIER, Lieut.-General, *Secretary.*

A VACANCY for PUPIL for a term of 3 years occurs in an old established (80 years) pharmacy. A comfortable home and every opportunity of learning the business under the supervision of the principal are offered. Apply, W. T. FORBES, Pharmaceutical Chemist, Reigate, Surrey.

IMMEDIATELY.—A Chemist's ASSISTANT, out-doors, to take charge of Drugs and Diary, not Ledger. Must be sober, punctual, obliging, and write well. Hours from 8.45 a.m. to 7.30 p.m. 1 hour for dinner. Sunday work light. Salary £7 monthly. Apply, stating age, height, weight, and previous engagement (carte returned), to H. T. STILES & SON, Surgeons, Spalding.

IMMEDIATELY.—A good Junior ASSISTANT or IMPROVER, accustomed to Prescribe, Dispense, and Family Retail. Good reference indispensable. Full particulars, with carte, to JOHN LEA, Folkestone.

BY December 3rd.—A qualified ASSISTANT, to take charge of a business. Good salary given to a suitable person. Preference given to a total abstainer. Apply, with full particulars, as to reference, age, &c., to CHEMICUS, Ferndale, Pontypridd.

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TEMPORARY ASSISTANT for Tuesday and Saturday evening. Address, with references, to J. EMSLEY, 41, High St., Stoke Newington, N.

A COMPETENT ASSISTANT. Not under 23 years of age. In-doors. Of good address and experience. Must have good references to character and ability. One desiring a permanency, with Minor qualification preferred. Apply personally, if possible, to W. BOWER, Pharmaceutical Chemist, 96, Tottenham Court Rd., London, W.

A QUALIFIED ASSISTANT, married, for Branch. If able to Prescribe and Extract Teeth preferred. One who has been accustomed to good class business. Unfurnished rooms and gas provided. Please state salary required and all usual particulars, to A. P. P., Messrs. Herrings & Co., 40, Aldersgate St.

IMMEDIATELY.—In-door. £40 per annum. An active and obliging gentlemanly ASSISTANT. One who has been accustomed to good business. Able to be left in charge occasionally. Must be well recommended. Send experience, age, height, and photo. Address or call at 317, Fulham Rd., South Kensington, London.

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A JUNIOR ASSISTANT. Apply, stating age, salary required, and giving references, to J. H. ADAMS & Co., Stoke-upon-Trent.

ASSISTANTS WANTED.

FOR the Midlands.—An energetic Junior ASSISTANT for brisk Retail, conducted on Store principles. Member of Christian church preferred. Hours 8 to 8. No Sunday duty. State salary required (out-door). Address, DRUGS, Butler & Crispe, Cheapside, London.

RANDALL & SON, Southampton, seek immediately a Junior ASSISTANT, well grounded in Dispensing and general business. Good personal character. In house. State salary required, age, height, previous experience, &c.

ASSISTANT, out-door, in a Surgeon's Dispensary at the West of London for Dispensing and light Retail. Must be a quick and accurate Dispenser, with good references as to trustworthiness. Apply, by letter only, stating full particulars, W. F., 99, Sutherland Gardens, W.

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THE Kilburn, Maida Vale, and St. John's Wood General Dispensary.—The appointment of DISPENSER at the above Dispensary is now vacant. Salary £70 per annum, with rooms, coals, gas, and attendance. Candidates, who must have a Medical qualification, or be Associates of the Pharmaceutical Society, are requested to send in their applications and testimonials at once, to the HONORARY SECRETARY, at the Dispensary, 13, Kilburn Park Rd., Kilburn, N.W.

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A JUNIOR ASSISTANT for Dispensing and light Retail business. Apply, with photo, stating age, height, salary required, references, &c., to H. MORNEMENT, Chemist, Gt. Yarmouth, Norfolk. Churchman preferred.

EARLY in December.—A Junior ASSISTANT, accustomed to an Agricultural trade. If able to Extract Teeth preferred. Apply, stating age, height, experience, and salary required, to H. C. WEBB, Pharmaceutical Chemist, Buckingham. Carte de visite if convenient; to be returned.

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A BUSINESS, returning £6 to £7 weekly, and of a most profitable character. Immediately. In consequence of sickness. Corner premises, W. Large house; portion let off. Reasonable offer accepted. Mr. RUTTER 99, Devonshire Rd., Chiswick, W.

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Samples and particulars forwarded on receipt of stamped envelope.

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So combined, the oil is subdivided into minute particles, which can be seen under the microscope to be as fine as the granules of milk, and much finer than any that can be obtained by any emulsion with gums. On the fineness of the emulsion depends the digestibility of the oil. "The digestive change undergone by fatty matters in the small intestine consists mainly in their reduction into a state of emulsion, or division into infinitely minute particles."

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"This is a really valuable preparation, and, as far as we know, a novelty. It contains beef-juice and citrate of iron in solution in wine, and is therefore a very powerful and rapidly acting tonic. Children, as well as adults, take it easily; and, as its taste is by no means unpleasant, it can hardly fail to attain great popularity."

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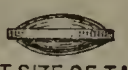
Hazeline is distilled from the fresh green inner bark of *Hamamelis Virginica*, the American Witch Hazel. It represents, in a concentrated form, all the active principles of the plant. It is a clear, colourless fluid, having a fragrant, agreeable odour, and slightly astringent taste. Does not stain linen, and is entirely free from toxic or irritating properties.

The Compressed Tablets (Wyeth)



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Of Chlorate of Potash and other drugs usually employed for throat affections. Chlorate of Potash with Borax; Chlorate of Potash with Chloride of Ammonium; Chloride of Ammonium with Borax, &c. The pure drug, without any addition, is compressed in very small lenticular discs, which are easily retained in the mouth while singing or speaking. The great advantage of these Tablets over the ordinary lozenges is, that they are free from the irritating saccharine matter with which ordinary lozenges are diluted. They are now almost universally prescribed by the profession in preference to the usual gargles, for when allowed to dissolve in the mouth the saliva becomes charged with the salt, carrying it directly to the affected parts, thus really securing all the beneficial effects of a continuous gargle, without the injurious exertion which was required by the old method. Supplied in Packages at 1s., 2s. and 3s.

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The following formulæ and combinations embrace all those in general request. Others will be added as the demands of the profession warrant.

We claim for the Wyeth Hypodermic Tablets:

Absolute Accuracy of Dose.
Ready and Entire Solubility.
Perfect Preservation of the Drug.

Their convenience and utility will at once be apparent on examination.

Morphiæ Sulphas ....1-3 grain.	Morphiæ Sulphas ....1-8 grain.
Morphiæ Sulphas ....1-4 grain.	Atropiæ Sulphas .... 1-200 grain.
Morphiæ Sulphas ....1-6 grain.	Morphiæ Sulphas ....1-12 grain.
Morphiæ Sulphas ....1-8 grain.	Atropiæ Sulphas ....1-250 grain.
Morphiæ Sulphas ....1-12 grain.	Atropiæ Sulphas ....1-60 grain.
Morphiæ Sulphas ....1-3 grain.	Atropiæ Sulphas ....1-100 grain.
Atropiæ Sulphas ....1-120 grain.	Atropiæ Sulphas ....1-150 grain.
Morphiæ Sulphas ....1-4 grain.	Strychniæ Sulphas ..1-60 grain.
Atropiæ Sulphas ....1-150 grain.	Strychniæ Sulphas ..1-100 grain.
Morphiæ Sulphas ....1-6 grain.	Strychniæ Sulphas ..1-150 grain.
Atropiæ Sulphas ....1-180 grain.	

Dialysed Iron (Wyeth).

1. It is easily administered, the dose being very small.
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4. It has no effect on the bowels, producing neither constipation nor diarrhœa.
5. It does not blacken the teeth.

In ordering please specify Fer. Wyeth 3 oz. with Dropper.

NOTE.

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Burroughs, Wellcome & Co. Manufacturing Chemists,

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TABLE OF CONTENTS.

Page
"The Month" 421
Estimation of Nicotine. By Emil Scheffer..... 425
Cocaine and its Salts. By E. Merck .. 426
Tengkawang Fat, or Vegetable Tallow. By H. P. Bakker—(*concluded*) 428
Persian Opium 430

EDITORIAL ARTICLES AND NOTES:—
The Benevolent Fund 431
Notes:—Election of Annuitants — The Next Evening Meeting — Medical Dispensing — The Dispensing of Specialties—Professor Gille — Belgian Pharmaceutical Statistics—Repetition of Prescriptions—Increase of Chemists and Druggists in America—New Remedies for the German Pharmacopœia 432

PROVINCIAL TRANSACTIONS:—
Liverpool Chemists' Association:—
The Analysis of Bark. By A. C. Abraham 433
Cream of Tartaline. By M. Conroy 434
Manchester Pharmaceutical Association..... 434
Manchester Pharmacy Students' Association 435
Midland Counties Chemists' Association..... 436
Edinburgh Chemists' Assistants and Apprentices' Association 436

PROCEEDINGS OF SCIENTIFIC SOCIETIES:—
Chemical Society 436
Society of Arts:—
The International Health Exhibition: its Influence and Possible Sequels. By Ernest Hart 438

REVIEW:—
Stille and Maisch's 'National Dispensatory' 439

CORRESPONDENCE:—
The Benevolent Fund 440
Answers to Correspondents 440

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, December 3rd, 1884, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

The following paper will be read:—

"Liquid Extract of Cinchona."

By Professor REDWOOD.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at half-past 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION OF SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the 5th day of December next, at 12 o'clock precisely.

By order of the Council,

RICHARD BREMRIDGE,
Secretary and Registrar.

October 1st, 1884.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

There are at present *thirty-nine* annuitants, receiving £1320 per annum, and casual relief is also granted, amounting to nearly £700 per annum, involving a total annual expenditure of upwards of £2000.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and

£35 per annum to pensioners 65 years of age and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of Half-a-crown are entitled at each election of Annuitants to	ONE Vote.
Five Shillings	TWO Votes.
Half-a-guinea	FIVE Votes
One Guinea..	TEN Votes.
And to increase in the same proportion.	
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And to increase in the same proportion.	

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

WANTED.—The PHARMACEUTICAL JOURNAL for January 5th, 1884. Full price will be given by the SECRETARY, 17, Bloomsbury Square, W.C.

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Pharmaceutical Society of Great Britain.

CHEMISTRY AND PHARMACY..... Professor REDWOOD and Mr. DUNSTAN.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratories.

FORTY-THIRD SESSION, 1884—85.

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3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects are fully illustrated with experiments, diagrams and specimens, and examinations of the class are held on those subjects which have been previously treated of in the lectures.

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The class in Practical Dispensing and the Reading of Prescriptions is conducted by Mr. Joseph Ince, and meets twice a week at 5 p.m.

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Comprise the following subjects:—

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2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

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Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London, W.C.

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NEPENTHE.

FERRIS & CO. *v.* GOODMAN.

Notice is hereby given, that by an Order of the Chancery Division of the High Court of Justice, made the 18th day of July, 1884, in the above action, it was ordered that the Defendant and others be **perpetually restrained** from selling, or offering for sale, any formula or recipe for "**Nepenthe,**" and from otherwise prejudicing the sale thereof by, or injuring the title thereto, or Trade Mark therein, of the Plaintiffs, Messrs. FERRIS & Co., of Bristol, Wholesale Druggists, the **Registered Proprietors thereof.**

And it was further ordered that the Defendant do pay the costs of the said action.

Dated this 12th day of August, 1884.

(Signed) CHILTON & GREEN-ARMYTAGE, BRISTOL,
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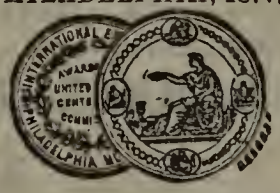

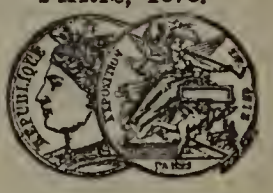

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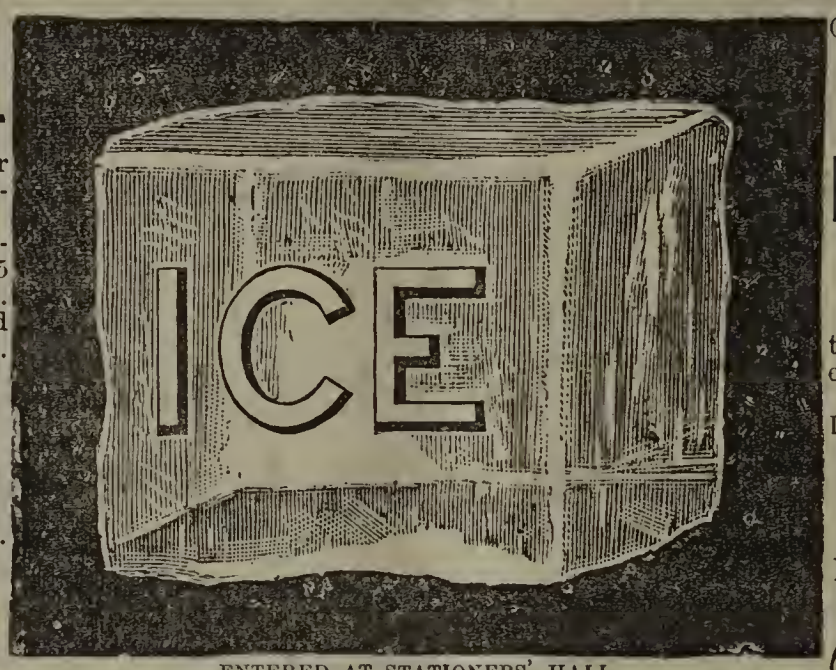

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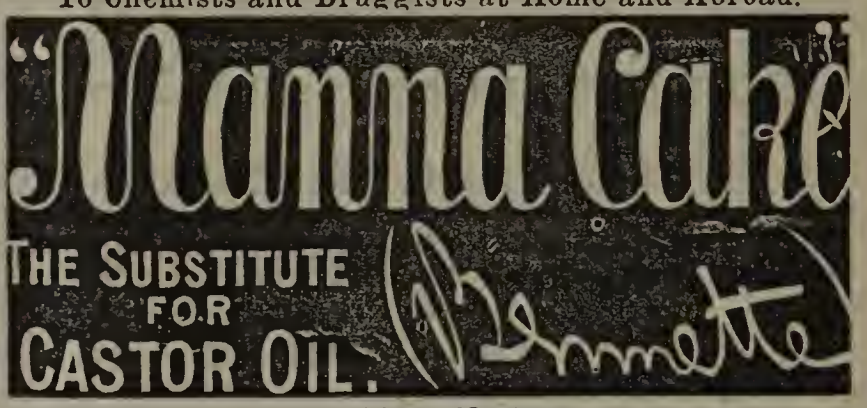

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Price 1½d. per Cake; 12 for 1s. 3d.; or, post free, 12 for 1s. 6d.; 36 for 4s.; Wholesale to the trade, 12s. per gross.

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BOURNE, JOHNSON & LATIMER.

No.	Description.	Shape.	Retail Price.	Wholesale Price.
1.	The Shilling Respirator	Oval	each 1/-	per doz. 0 8 0
2.	Metallic, Cotton Velvet Pads	,,	2/-	,, 0 12 0
3.	,, Silk Velvet Pads	,,	2/6	,, 0 18 0
3A.	Silver-plated Wire, Silk Velvet Pads	,,	2/6	,, 0 18 0
4.	,, ,, ,,	,,	3/-	,, 1 1 0
5.	,, ,, ,,	Square	4/-	,, 1 8 0
5A.	,, ,, ,, Without Ends	,,	3/6	,, 1 4 0
6.	,, ,, Elastic Silk Mouthpiece	,,	4/-	,, 1 10 0
7.	Gold-plated Wire, Silk Velvet Pads	,,	7/6	,, 2 8 0
8.	3-fold Silver-plated, Velvet Pads and Silk Mouthpiece	,,	6/-	,, 1 16 0
9.	,, Gold-plated ,, ,, ,,	,,	7/6	,, 2 8 0
10.	The Aerial Respirator, Silver-plated, Ladies'	Oval	5/-	,, 1 10 0
11.	,, ,, Gold-plated ,,	,,	6/-	,, 2 2 0
12.	,, ,, Silver-plated, Gents'	,,	6/-	,, 1 16 0
13.	,, ,, Gold-plated ,,	,,	7/6	,, 2 8 0
	(*The Aerials may be had covered with black or drab.*)			
14.	Gold-plated Wire, full size	,,	7/6	,, 2 8 0
15.	Gold Plates, full size	,,	7/6	,, 2 8 0
16.	Orinasal, Silver-plated Wire	Square	4/-	,, 1 10 0
17.	Ladies' Miniature, Silver-plated	Oval	5/-	,, 1 10 0
18.	,, ,, Gold plated	,,	6/-	,, 2 2 0
19.	The Manifold Respirator, of variable power, containing 6 Metallic Plates, 4 of which are moveable, Gold-plated	Square	10/6	,, 3 12 0
20.	Ditto ditto ditto	Oval	10/6	,, 3 12 0
	(*The Manifold Respirator may be worn with or without plates* A *and* B.)			
21.	Gents' full size, Silver-plated	,,	5/-	,, 1 10 0
22.	,, ,, Gold-plated	,,	6/-	,, 2 2 0
23.	The Cotton-wool Respirator, Silver-plated	Orinasal ,,	5/-	,, 1 16 0
24.	,, ,, Gold-plated	,,	8/6	,, 3 0 0
25.	,, ,, ,,	Oval ,,	5/-	,, 1 16 0
	(*As recommended by Professor Tyndall.*)			

Nos. 1, 2, and 3	Contain 1 Metallic Plate.	Nos. 7, 8, 9, 12, 13, 14 and 15	Contain 3 Metallic Plates.
,, 4, 5, 6, 10, 11, 16, 17, 18, 21, 22, 23, 24 & 25	,, 2 ,, Plates.	,, 19 and 20	,, 6 ,,

The following new patterns have recently been added to Stock:—

No. 15A. A cheap **Gold-plated OVAL Respirator**, to sell at 3/6. Price **30**/- per dozen.

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Each Respirator (from No. 4 upwards) is neatly put up in a Metal Box, and is priced so as to yield half profit.

A liberal supply of handbills and show-cards will accompany each parcel.

THE FOLLOWING ASSORTMENT CONTAINS THE LEADING PATTERNS:—

No. 1 Case:

Two each of Nos. 1, 2, 3, 4.
One ,, ,, 5, 8, 10, 12, 14, 15, 17, 18, 20, 21, 22.

Producing Retail		£4 5 6
Cost	£2 6 8	
Less 10 per cent.	0 4 8	
		2 2 0
Showing a PROFIT of		£2 3 6

No. 2 Case:

Six each of Nos. 1, 2, 3, 4.
Two ,, ,, 5, 6, 8, 10, 12, 17, 18, 21, 22.
One ,, ,, 7, 9, 11, 13, 14, 15, 16, 20, 23, 25.

Producing Retail		£10 18 6
Cost	£5 18 2	
Less 10 per cent.	0 11 10	
		5 6 4
Showing a PROFIT of		£5 12 2

With orders amounting to £2 *net*, we will send a Mahogany Glass-top Counter Case, with hinged lid, FREE OF CHARGE: and with orders amounting to £5 *net*, a handsome Mahogany Counter Case (size 22 × 12 × 4), with sloping top, hinged back, and sliding tray.

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For Hot Water, Infusions, &c.

ELASTIC TUBE.

FIG. 13.

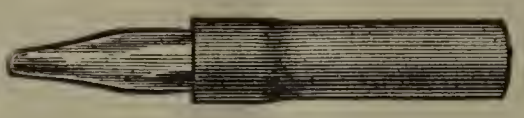

FIG. 8.

MAW'S IMPROVED.

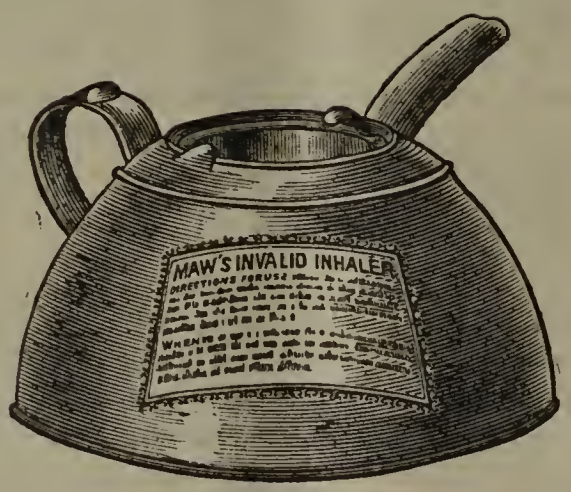

FIG. 100.

MAW'S INVALID.

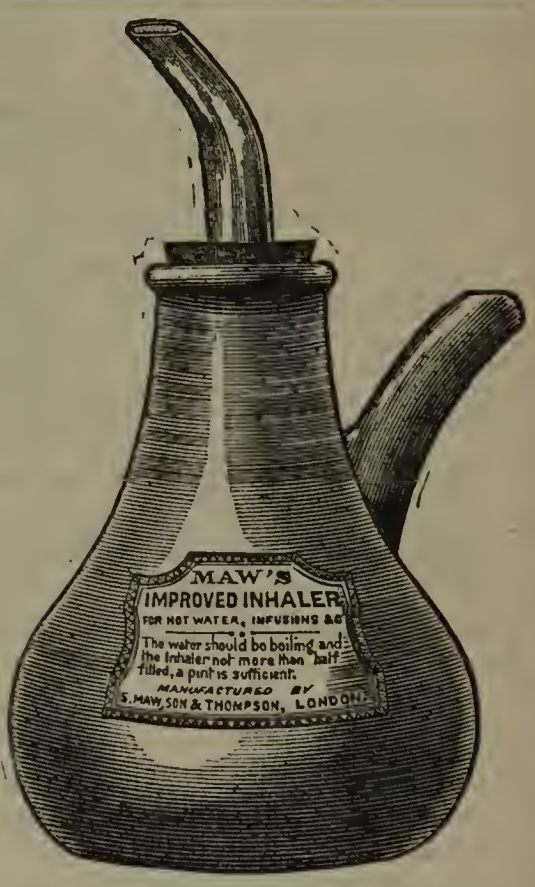

FIG. 8A.

MAW'S IMPROVED.

Fig. 8:—Marbled, 32s. per dozen.

Fig. 100:—White, 33s.; Gilt Lines, 39s. per doz.

This Pattern is specially adapted for use in bed.

Fig. 8a:—White, 21s. per doz.; Retail, 2s. 6d. each.

ELASTIC TUBES, as Fig. 13, will fit any of the above.

7 inches long, including Mouth-pieces ... ... 8s. per dozen.

9 inches long, including Mouth-pieces ... ... 12s. per dozen.

MANUFACTURED BY

S. MAW, SON & THOMPSON

LONDON.

"THE MONTH."

Cocaine hydrochlorate, the use of which in ophthalmic operations was alluded to last month (p. 343), has already attracted a good deal of attention, both in the United States and in this country. Professor L. Howe, of Buffalo, New York, gives the result of his experience of the use of the alkaloid, in the *Lancet* (Nov. 22, p. 911). He finds four drops of a ·02 per cent. solution is the least that will affect the sensibility of the eye, that anæsthesia of the conjunctiva commences about six minutes after the application of a full dose, reaches its maximum in about fifteen minutes, and in thirty or forty minutes commences to subside. A second or third application acts apparently with more rapidity than the first; hence a drop of the solution is used at intervals of five, three, and two minutes, or even one minute, until the full effect is produced. Professor Howe believes that cocaine is destined to rank as one of the most valuable agents in ophthalmic surgery. The dilatation of the pupil and paralysis of accommodation caused by it are of shorter duration than with atropine, whilst the solution, if free from solid particles, does not irritate the eye or retard the healing of wounds. So far no drawbacks have attended its use, although it has been shown to be poisonous if allowed to enter the circulation rapidly and in sufficient dose, killing small animals by paralysing the heart. Dr. C. Bader points out in the same journal that in cases of intolerance of light it acts like magic. In the *Boston Medical Journal* Dr. H. W. Bradford states that he has used stronger solutions, and finds that one drop of an 8 per cent. solution causes anæsthesia of the cornea and conjunctiva in two minutes; also that it is possible to keep up anæsthesia for several hours if required. A 4 per cent. solution, according to Dr. C. H. Williams, causes anæsthesia in about five minutes. The possible uses of cocaine offer an enormous field for experiment, and consequently there is already a considerable demand for the alkaloid. It has been used to cause anæsthesia of the mucous membrane of the nose, larynx, urethra and rectum, and it permits of operations of a usually painful character being undertaken without the use of chloroform or ether. It will probably be shortly tried by dentists to deaden the sensitive dentine while a tooth is being scraped previously to stopping and to render anæsthetic the crown of the tooth before extraction. Possibly also it will find employment as an application previous to lancing painful tumours, especially in children. It is a curious fact that the property of cocaine to render the tongue temporarily insensible at the point of contact is mentioned in the first paper on the alkaloid, published in 1860, and the observation has thus remained unapplied during nearly a quarter of a century.

The earliest notice of an inquiry into the chemistry of coca leaves is an editorial note by the late Professor Wöhler in the *Annalen der Chemie und Pharmacie*, for May, 1860. He there refers to several fruitless attempts to obtain from coca leaves the active principle to which their physiological action is due, and he mentions one case in which he had received through Herr v. Tschudi, from a chemist at La Paz, in Bolivia, a substance which was supposed to be a crystallizable base extracted from coca leaves, but turned out, on examination, to be nothing more than calcium sulphate. Having obtained from Professor Haidinger, in Vienna, a large quantity of coca leaves, collected at his suggestion by Dr. Scherzer while engaged in the expedition of the Austrian frigate, *Novara*, Professor Wöhler induced Herr Niemann, one of his assistants, to undertake the investigation which led to the isolation of cocaine. This substance was obtained by digesting the finely divided coca leaves for several days with strong (85 per cent.) alcohol to which some sulphuric acid had been added. The dark coloured liquor thus formed was pressed out from the leaves, filtered and mixed with some caustic lime, which precipitated some of the chlorophyll and a waxy substance. The filtered alkaline liquor was neutralized with sulphuric acid, again filtered, the alcohol evaporated off and the residue mixed with water, which dissolved out the cocaine in the state of sulphate, leaving a dark green semi-liquid mass containing the remainder of the chlorophyll. The cocaine was then precipitated with sodium carbonate and purified by recrystallization from ether and alcohol. Cocaine is described by Professor Wöhler as forming small colourless and inodorous prismatic crystals, being slightly soluble in water, more so in alcohol, and very soluble in ether, having a strong alkaline reaction, a slightly bitter taste, and as producing upon the tongue the peculiar effect of temporary and almost complete insensibility at the point of contact. The great similarity of cocaine to atropine, except in not acting upon the pupil of the eye, was also pointed out and the close resemblance of the compound formed with gold chloride by both alkaloids was mentioned; the distinctive feature of the cocaine compound being that of yielding a large proportion of benzoic acid when heated. It may be mentioned that the reference in Watts's Dictionary, under "Cocaine," to this paper, is very inaccurate.

The indefatigable industry of continental chemists in the application of synthetical methods to the formation of new compounds has brought into the field another antipyretic, which is said to have been used successfully in a large number of cases in the clinic of Professor Nothnagel (*Pharm. Post*, Nov. 1, p. 1038). It has the constitution of a secondary chinoline base, being one of a number of chinoline derivatives prepared by Professor Skraup, and is represented by the systematic name "tetrahydroparachinanisol." The salts of this base, which have an acid reaction, are all freely soluble in water and have the property of forming green compounds when treated with solution of ferric chloride and oxidizing agents. On account of this peculiarity the cumbrous systematic name has been dropped in favour of the shorter designation "thallin." The hydrochlorate, sulphate and tartrate of thallin and the hydrochlorate of ethylthallin are the salts that have been used, and these are said to show great antipyretic activity in doses of quarter, half, and three quarters of a gram, a point in which thallin would seem to compare favourably with some of its competitors. The lowering of the temperature is said to take place gradually and to last a considerable time, whilst it is not accompanied by any secondary disturbances. Thallin can be conveniently administered in wafers containing a quarter or half of a gram of the sulphate. Two other chinoline derivatives have also been experimented with: parachinanisol, which has only slight antipyretic properties, and tetrahydroparaoxychinoline, which proved fatal to guinea-pigs in doses of 0·2 to 0·6 gram, with violent tetanic symptoms. It may be remarked that the name "thallin" hardly

seems to be happily chosen, since the appearance of "thallin. sulph." on a prescription might easily lead to misconception and perplexity.

At the Medical Congress held in Berlin, Dr. Unna described a pill-coating material which had been devised by him with the object of protecting pills from the action of the gastric juice, and yet allow them to dissolve in the alkaline contents of the small intestine. The preparation, being obtained from horn, has been named "keratine." It is insoluble in hydrochloric acid, but easily soluble in alkalies. It is made by digesting horn shavings first in artificial gastric juice, until all the albuminous substances capable of being dissolved out by pepsin and hydrochloric acid are removed, and then for several weeks in ammonia. The "keratine" is dissolved by the ammonia, and upon evaporation of the solution until only a trace of ammonia remains a gum-like liquid is obtained, which can be used for coating pills. As Dr. Unna has found that pills made with ordinary excipients are apt to swell and burst the keratine coating, he recommends the use of an excipient consisting of charcoal, almond oil and cacao butter. Each pill should be covered with a layer of cacao butter and then coated two or three times with keratine. Although not soluble in hydrochloric acid keratine is soluble to some extent in acetic and citric acids; these acids, therefore, should not be given at the same time as keratine-coated pills. Notwithstanding the claim put forward in behalf of this substance, the *Medical Chronicle* (Nov., p. 182) states that some keratinized pills of salicylate of soda, prepared by a Hamburg pharmacist recommended by Dr. Unna, when recently tested in the laboratory at Owens College did not remain unchanged upon being exposed to the influence of gastric juice at a temperature of 39° C., the keratine coating breaking down within ten minutes and traces of salicylic acid being then recognizable in the liquid. On the other hand, it is admitted that at the Congress Dr. Unna exhibited pills that were unaffected by artificial digestion.

Some experiments have been made by M. Barnouvin to determine whether the deposits which form in solutions of alkaloids and their salts decompose or modify the dissolved alkaloid. He reports (*Bull. Comm.*, Oct., p. 484) that solutions of atropine sulphate and morphine hydrochlorate in rose water were prepared, containing 3 parts in 1000, and kept during two months, at the end of which time they manifested considerable flocculence. They were then filtered, and 10 c.c. of each evaporated, when the residue from the solution of atropine sulphate weighed 0·033 gram, and that from the solution of morphine hydrochlorate 0·032 gram. As these figures agree closely with the quantity of each salt used, and the author found that the alkaloids had preserved all their characteristic properties, he concludes that the development of flocks in solutions of alkaloids does not exercise any influence upon their therapeutic properties, and that from a medical point of view the flocks do not present greater inconveniences than any other foreign substance occurring in such solutions.

The method ordinarily adopted for the conversion of albuminoid substances into peptones, by the use of animal pepsine and hydrochloric acid, the latter being neutralized at the end of the digestion by means of carbonate of soda, is not free from objection, as the product contains an appreciable quantity of sodium chloride and is necessarily costly. An observation communicated to the Academy of Sciences by M. Marcano, of Caracas, Venezuela (*Comptes Rendus*, xcix., 811) is suggestive of what may prove to be a preferable process. M. Marcano has found that if a small quantity of the fresh sap from certain plants, the agave for example, be added to chopped meat just covered with water, and the mixture be kept at a temperature of 35° to 40° C., an active fermentation is immediately set up, with the evolution of inodorous gases. At the end of thirty-six hours the fibrin has disappeared and a liquid is left containing peptone equalling in weight, when dried in a stove, one-fifth of the fresh meat used. This fermentation appears to M. Marcano to be due to the vital action of micro-organisms and to resemble the peptonization of the gluten of flour by a bacterium which is said to take place in bread-making (*Pharm. Journ.*, [3], xiv., 64, 162). In confirmation of this view, he states that if the plant juice be saturated with chloroform the fermentation is not set up; moreover, he has cultivated, by sowing a few drops of agave sap in sugared water, a fine "*mucorinée*," which is capable of completely dissolving fibrin in the presence of water. This property is said to be by no means peculiar to agave sap, but to belong also to a large number of other saps and fruit juices. Papaw juice, notwithstanding the "pepsin" it contains, is said to be relatively weak, compared to the peptonizing activity of other juices from which it is impossible to extract any similar digestive principle, as for instance, the juice of the sugar cane. It is said that the crude peptone obtained by this process gives upon analysis an average of 10 per cent. of nitrogen, whilst the mineral salts do not exceed 1·4 per cent.; also that in its reactions it corresponds with a very pure peptone, giving not the slightest precipitate with potassium ferrocyanide and acetic acid. M. Marcano considers that this "peptonic fermentation" will afford a simple and economic means of preparing pure peptone quickly and at a low price, and he suggests that it might be applied upon a large scale so as to allow of the export of meat from South America in a form more nutritive and economical than the extract.

A modified process for the preparation of "absorbent cotton" is published by Mr. E. Poulsson (*Am. Journ. Ph.*, Nov., p. 574). It consists in boiling a kilogram of cotton for half an hour in four litres of water containing 25 grams of caustic potash, then washing it till every trace of alkali is removed, squeezing it dry and steeping it for fifteen or twenty minutes in a 5 per cent. solution of chlorinated lime. After being washed with a little water, the cotton is next dipped into water acidulated with hydrochloric acid, rinsed in fresh water, boiled again in alkaline water as at first and washed, then dipped into acidulated water, rinsed and dried.

Commenting upon the preference expressed by Mr. Dymond, in a paper read before the Pharmaceutical Conference (before, p. 235), for the process of roasting together calcium sulphate and charcoal in the preparation of "sulphurated lime," the editor of the *American Druggist* (Nov., p. 408) says it might be inferred "that the writer considers the calcium sulphide to be the active ingredient in the preparation," and that he estimates the therapeutic value to be in proportion to its presence. This, however, the commentator states is not in ac-

cordance with his experience since he has not found calcium sulphide to be therapeutically so active as "sulphurated lime." He states that the substance upon which present therapeutic experience is based is that prepared by the process adopted in the United States Pharmacopœia of 1880, which consists in heating sulphur and lime together in a closed crucible, and that he should hesitate to adopt Mr. Dymond's preference until the clinical experience of physicians competent to pronounce upon the value of the product is forthcoming.

Arsenic is a very common contamination of zinc, although very objectionable when the zinc is required for analytical purposes. According to M. L'Hote (*Journ. Pharm.*, [5], x., 254), arsenic can be rapidly eliminated by throwing into melted zinc 1 to 1½ per cent. of magnesium chloride and agitating, when whitish fumes of magnesium chloride are given off, which carry with them the arsenic. Upon then pouring the metal into cold water granules are obtained completely free from arsenic and easily attacked by 10 per cent. sulphuric acid.

The investigation of the characteristic constituents of saffron, which has previously occupied the attention of several chemists, has been taken up by Herr Kayser (*Berichte*, xvii., 2228). By distilling saffron suspended in water in a current of carbonic anhydride, shaking the distillate with ether, and evaporating the ether in a current of carbonic anhydride, the essential oil was obtained as a very mobile, scarcely yellowish coloured liquid, having an extremely intense odour of saffron, readily becoming thick and brown by absorption of oxygen from the atmosphere, and giving upon analysis figures corresponding with the formula $C_{10}H_{16}$. Crocin was obtained by treating an aqueous extract, made without heat from saffron previously exhausted with ether, with purified animal charcoal, which removed all the colouring matter; then filtering, washing and drying the charcoal, boiling it with 90 per cent. alcohol and filtering. Upon removal of the alcohol the crocin was left as a brittle yellow-brown mass, yielding a pure yellow powder, freely soluble in water and dilute alcohol, less soluble in absolute alcohol, and giving up only traces to ether. With concentrated sulphuric acid it gave a deep blue solution, passing to violet, cherry red and finally to brown; with nitric acid a deep blue, passing almost immediately to brown; with hydrochloric acid it underwent no change of colour. Acetate of lead produced no precipitate in a solution of crocin in the cold, but on warming the solution, decomposition at once took place, and the liquid then reduced Fehling's solution. As previous workers used lead acetate in the separation of crocin Herr Kayser supposes that their product always contained crocetin. He attributes to pure crocin the formula $C_{44}H_{70}O_{28}$ and to crocetin $C_{34}H_{46}O_9$, the decomposition being represented by the following equation:—

$$2\,C_{44}H_{70}O_{28} + 7\,H_2O = C_{34}H_{46}O_9 + 9\,C_6H_{12}O_6.$$

An ethereal extract of the residual saffron yielded a crystalline bitter substance, freely soluble in water and alcohol, less easily in chloroform and ether, and melting at 75°. This has been named "picrocrocin" and is represented by the formula $C_{38}H_{61}O_{17}$. It presents the interesting character that when warmed in aqueous solution with lead acetate, lime or baryta water or acid it splits up into sugar and an essential oil, which has a strong odour of saffron and the composition of a terpene.

The *Coronilla scorpioides* is a leguminous plant growing in the south of France, where it is reputed to be injurious to sheep that eat it. A neighbouring species, *C. varia*, has also been credited with possessing diuretic properties. The seeds of *C. scorpioides* are very bitter, and some of them having been found amongst the *débris* from the cleaning of barley used in a brewery, Messrs. Schlagdenhauffen and Reeb undertook an examination of them. They report (*Journ. Ph. Alsace-Lor.*, Oct., p. 319) that they have succeeded in separating from an alcoholic extract a crystallizable alkaloid, an aqueous solution of which rapidly produces paralysis of all the organs in frogs, and which they consider to be the active principle of the seeds. An acidulated aqueous solution, precipitated with iodoiodide of mercury, gives a crystallization of kermes-brown needles, which after a few minutes are changed into a mass of very delicate deep green needles, having a brilliant iridescence.

Mr. Preston records (*Am. Journ. Pharm.*, Nov., p. 567), the presence in "poke root" (*Phytolacca decandra*, Linn.) of an alkaloid, which he proposes to call "phytolaccine." It was obtained by concentrating a strong decoction of the root after treatment with subacetate of lead, adding saturated alum solution, then ammonia in slight excess, evaporating and extracting the powdered residue with alcohol. From the alcoholic liquid crystals separated, which after treatment with animal charcoal and recrystallization were nearly white. They were soluble in alcohol, moderately so in water, nearly insoluble in ether and chloroform, and volatilized completely when heated upon platinum foil. In aqueous solution phytolaccine gave precipitates with phosphomolybdic acid, tannin, potassium iodohydrargyrate, and auric chloride. An alcoholic solution, neutralized with dilute hydrochloric acid, yielded upon concentration nearly colourless acicular crystals of the hydrochlorate, which are described as possessing a strong acrid taste.

A series of papers having an interesting bearing upon the nature of the chemical processes under which the assimilation of nitrogen takes place in the plant organism has been communicated to the German Chemical Society by Messrs. Pechman and Welsh (*Berichte*, xviii., 936, 2384, 2396). It is generally understood that this assimilation occurs in the form of ammonia and nitric acid, but almost nothing is known as to the manner in which nitrogen is taken up into the structure of nitrogenous plant-substances, especially of alkaloids and albuminoids. The results of the investigations of Königs point to the probability that alkaloids are generally pyridine derivatives (*Pharm. Journ.*, [3], xiii., 127); it becomes therefore of interest to discover what plant constituents might be capable of combining to form pyridic compounds in the plant organism under ordinary conditions as to pressure and temperature. The authors have found that malic acid, under the influence of concentrated sulphuric acid, splits up into formic acid and a hypothetical compound that they consider to be a semialdehyd of malonic acid, two molecules of which in its nascent state condense with loss of two molecules of water to form an acid that they have obtained in crystals and named "cumalinic acid." When submitted to the action of aqueous ammonia or ammonium carbonate at the ordinary temperature cumalinic acid almost immediately takes up the elements of ammonia, with

loss of water, and is converted into oxynicotinic acid; or, as it is also called, oxypyridinmonocarbonic acid.

$$C_5H_3O_2-CO_2H+NH_3=H_2O+C_5H_3N\begin{matrix}/\ CO_2H\\ \backslash\ OH\end{matrix}$$

Cumalinic Acid.

This easy conversion of malic acid into a derivative of nicotinic acid, which is known to stand in very close relationship to several alkaloids, may, therefore, the authors think, represent to some extent a process which goes on in the plant. It is also worthy of note that two other acids, both occurring naturally in Papaveraceous plants, chelidonic and meconic acids, behave similarly towards ammonia, being converted into corresponding oxypyridindicarbonic acids, but only under the influence of heat or pressure. As an explanation of the relationship of these three acids it is suggested that they are all derivatives of a complex group having the empirical composition $C_5H_4O_2$, in which case cumalinic acid would be represented by the formula $C_5H_3O_2.CO_2H$; chelidonic acid by $C_5H_2O_2.(CO_2H)_2$; and meconic acid by $C_5HO_2.(CO_2H)_2.OH$.

In a recent communication to the Academy of Sciences Dr. Doningos Freire reports the continuation of his researches upon the organism causing yellow fever (*Pharm. Journ.*, [3], xiv., 321, 421, 1045), and states that he has succeeded in attenuating the virus so that it can be used like vaccine. He claims that four hundred persons have been treated with perfect success, but it is not known as yet how long the protective influence will continue.

At the last meeting of the Linnean Society, a paper was read by Mr. E. M. Holmes on "*Cinchona Ledgeriana* as a Species." The author stated that, judging from the variable character of the bark met with in commerce under this name, some of which, like that from Darjeeling, was clearly a pure calisaya bark, while others presented the characters of hybrids of that species with *C. officinalis*, he had come to the conclusion that a number of varieties and forms and probably some hybrids of *C. Calisaya* are now in cultivation under the name of *Ledgeriana*. A comparison of herbarium specimens from different localities pointed to the same conclusion. The history of Ledger's seed was traced to prove that this must have been the case; the original seed having consisted of the product of about fifty trees and having been at first considered as calisaya, and placed under circumstances by which they were almost certain to have been subjected to the influence of hybridization. The author claimed that sufficient attention has not been paid to the characters presented by the bark, and expressed his belief that if these were studied in conjunction with those afforded by the flowers and fruit, the various forms now cultivated under the name of *Ledgeriana* would be more easily defined and recognized. On comparing the essential characters mentioned by Dr. Trimen as distinguishing the *C. Ledgeriana*, Moens, he found that they were to be met with in other forms of calisaya, the small flowers being found in the var. *pallida* of Weddell, and leaves of exactly similar shape in the var. *microcarpa*, Wedd., while the drooping flowerbuds did not occur in a specimen received from M. Moens by Mr. J. E. Howard, a flowering twig of which was placed upon the table at the meeting. He, therefore, concluded that if there was anything characteristic in the habit of the tree to enable it to be easily recognized by sight it should be regarded only as a horticultural form, referable to *Cinchona Calisaya*, var. *pallida*, as a form "Trimeniana." Judging from a specimen of the bark received from Mr. T. N. Christie of Ceylon, for the Museum of the Pharmaceutical Society, half of which had been analysed by Dr. Paul, he considered that the analysis bore out the opinion he had previously formed of this particular bark, and in which Mr. J. E. Howard had agreed, viz., that it was a hybrid between *C. Calisaya* and *C. officinalis*.

At the same meeting Mr. C. T. Druery read an interesting paper on "A Singular Mode of Reproduction in *Athyrium Filix Fœmina*, var. *clarissima*." In a previous communication the author had pointed out that in this fern he had found prothallia with archegonia and antheridia developed on their under surface, arising from a bifurcation of pear-shaped bodies, situated, the larger end downwards, in the position usually occupied by the sori, and that these ultimately developed by a bifurcation of the apex into prothallia. In the present paper he showed that these did not arise by the development of the sporangia, but were apparently formed by the development of filamentous threads, which occupied the same position, and a few of which became thickened while the others remained filamentous and were ultimately starved. There are, therefore, now three modes of reproduction by bulbils known in ferns. 1st. Bulbils developed in the axils and on the upper surface of the frond. 2nd. Bulbils occupying the place of sori on the under surface of the frond, not under an indusium, but like the first surrounded by scales at the bases. 3rd. Pseudobulbils developed in the place of sori, and under an indusium, developing prothallia, and producing young ferns only after fertilization of the archegonium by the antherozoids while still attached to the parent plant. This mode of reproduction serves to link the cryptogamic plants to the phanerogams, since the prothallium practically takes the place of a flower.

The comparatively mild and clear weather during the greater part of the month has led to numerous observations concerning the untimely flowering of plants during the autumn, more particularly in the south and west of England. A gentleman at Belfast, writing to *Nature* (Nov. 20, p. 54), mentions that primroses are now flowering in his garden, and that a laburnum is in blossom close by. A correspondent writing from Wareham noticed in flower the week before last *Spiræa Ulmaria*, *Polygala vulgaris* and *Campanula rotundifolia*. The laburnum and the primrose have been observed in blossom in Wales and London, and off one raspberry plant one hundred ripe fruit have been gathered. An interesting paper has appeared on this subject by Dr. M. T. Masters (*Nature*, Nov. 6, p. 13). He points out that such cases of abnormal development of flower and fruit are due either to continuous growth, to renewal of growth after a longer or shorter period of arrest, or to the development of a flower-bud in place of a leaf-bud. In the case of the laburnum and other trees in which the flowers usually arise from a shortened branch or spur, and in which the central point of the spur usually develops a leafy shoot, the autumn flowers usually arise from the transformation of the leafy shoot into a flowering one. These spurs resemble tubers in being reserves of nourishment, their cells usually containing much starch, and arrest of growth at one time may cause the subsequent development of flowers at another. These unseasonably developed flowers rarely produce seeds.

ESTIMATION OF NICOTINE.*

BY EMIL SCHEFFER.

Several methods have been published to estimate the amount of nicotine in tobacco, but for its estimation in different preparations of tobacco we have only the volumetric test with Mayer's solution, which, although not quite perfect, yet gives approximately correct results.

The writer had lately to make a large number of estimations of nicotine from tobacco extracts, which he executed according to Dragendorff's method.†

One of the greatest obstacles for correct work is the circumstance that a more dilute solution of nicotine requires a larger proportion of Mayer's solution than a stronger solution. To get if possible a clue to this anomaly, I decided to prepare pure nicotine, and make experiments with it.

Pure nicotine was prepared by distilling extract of tobacco with caustic soda; the distillate was slightly supersaturated with sulphuric acid, then evaporated and treated with absolute alcohol to separate the sulphate of ammonium. The alcoholic solution of sulphate of nicotine was evaporated on a water-bath to drive off the alcohol; the watery solution of residue was mixed with ether, and concentrated solution of caustic soda added. After repeated strong agitation the mixture was allowed to separate; the ethereal solution was drawn off with a pipette into a tared beaker, and the ether allowed to evaporate spontaneously. When the odour of ether had disappeared, the remaining liquid, which had a slight yellowish tint, was weighed, dissolved in water, and the amount of nicotine in it ascertained with normal volumetric solutions of hydrochloric and sulphuric acids.

The neutralized solutions were then, with the addition of distilled water, brought to a certain volume.

A. 4·387 residue of ethereal extraction required 24·3 c.c. of normal HCl, corresponding to 3·936 pure nicotine.

The neutralized solution was diluted to 500 c.c. of 0·787 per cent. nicotine.

B. 8·793 residue of ethereal extraction were dissolved in water to measure 250 c.c.; of these 20 c.c. required for neutralization 3·56 normal oxalic acid.

a. 80 c.c. required 14·4 c.c. of normal HCl; were diluted to 250 c.c.

b. 80 c.c. required 14·4 c.c. of normal H_2SO_4; were diluted to 250 c.c.

c. 60 c.c. required 10·8 c.c. of normal H_2SO_4; were also brought to 250 c.c.

According to the quantity of H_2SO_4 needed for the neutralization of 80 c.c. of solution B. the 8·793 of ethereal residue correspond to 7·290 nicotine, and B. a. contains 2·333 nicotine, or 0·9332 per cent.; ‡B. b. contains 2·333 nicotine, or 0·9332 per cent.; B. c. contains 1·749 nicotine, or 0·6996 per cent.

The tests were made with Mayer's solution, which was prepared from perfectly pure mercuric chloride and potassium iodide, so that 1 c.c. contained exactly 0·01354 $HgCl_2$ and 0·0498 KI.

Taking the equivalent for nicotine as 162, and supposing that the precipitate obtained was composed of $HgI_2,C_{10}H_{14}N_2(HI)_2$, and has therefore the molecular weight of 872, it was found that Dragendorff gives the amount of nicotine that is indicated by 1 c.c. of Mayer's solution too low, and that it ought to be twice as large, that is, instead of 0·00405, it ought to be 0·0081.

The writer was first led to these investigations by the statement of Dragendorff, that only one-half of the Mayer's solution used was used for the formation of the precipitate. Mr. Zinnoffsky, who made the tests, has ascertained the amount of mercury in the precipitate, judging by this of the composition of the precipitate; but he has not weighed (at least nothing is said about) the precipitate, and then he has omitted to prove the presence of nicotine in the liquid after the Mayer's solution has ceased to give precipitate.

Then, also, by taking the composition of hydrochloride of nicotine as $C_{10}H_{14}N_2(HCl)_2$, another reason is given for obtaining the coefficient of nicotine too small.

Why it is that all our text-books give the composition of hydrochloride of nicotine as $C_{10}H_{14}N_2(HCl)_2$, while the sulphate, they say, consists of 1 equivalent of nicotine and 1 equivalent of sulphuric acid, is difficult to understand, as the same quantity of nicotine which is neutralized by 49 H_2SO_4 is also neutralized by 36·4 HCl.

Gmelin has the composition of sulphate of nicotine, $C_{20}H_{14}N_2,HO,SO_3$ (old notation), and Husemann says that 49 sulphuric acid neutralizes 162 nicotine, and both authors give for the hydrochloride:

$C_{10}H_{14}N_2(HCl)_2$, Husemann, and
$C_{20}H_{14}N_2,2HCl$, Gmelin.

Now for the proof of my assertions.

The precipitate obtained was collected on a tared filter, washed and dried under a bell glass above sulphuric acid, and the amount of Hg and I in it ascertained. For this purpose a certain quantity of the dried precipitate was placed in a beaker and ammonia water added to it by which the yellowish precipitate was transformed into a fine white powder. When the transformation was completed, freshly prepared ammonium sulphide was added, whereby the mercury was separated as HgS.

After the white precipitate had disappeared, and was entirely decomposed, the precipitate of HgS was collected on a tared filter, washed, dried and weighed. The liquid resulting from the precipitate by Am_2S with the wash water was heated on the water-bath until all odour of H_2S had disappeared, then slightly acidulated with sulphuric acid, and $AgNO_3$ added as long as a precipitate was formed.

After the precipitate had subsided, the liquid was decanted from the precipitate, and filtered through a tared filter; to the moist precipitate of AgI in the beaker, ammonia water was added, and macerated over night, and the next morning the AgI collected on the same filter, thoroughly washed, and, having become air dry, was heated in a drying oven at 212° F. until the weight kept constant.

The ammoniacal liquid running off from the AgI did not become turbid on addition of HNO_3, and thereby the absence of chlorine in the original precipitate was confirmed.

To control the result of examination of the precipitate by Mayer's solution, the liquid obtained was also examined; the mercury was precipitated by H_2S, and the precipitate of HgS washed and dried. The liquid, *plus* washings, was heated on the water-bath until H_2S was driven off, then pure Na_2CO_3 added, evaporated to dryness, and strongly heated. Dissolved in water, it was slightly acidulated with H_2SO_4, and the amount of iodine ascertained volumetrically with $\frac{1}{10}$ normal solution of $HgCl_2$. The addition of Na_2CO_3 to the acid solution is necessary to drive off the nicotine in the solution.

In trying to estimate the iodine in this solution with $HgCl_2$ before use of carbonate of sodium was made, at first a resinous yellow precipitate was obtained similar to the resinous precipitate in the original tests. Other experiments convinced me that nicotine was present, particularly the strong odour after addition of carbonate of sodium and the alkalinity of the vapours.

On making the tests with Mayer's solution it is of importance to avoid and prevent the precipitate from becoming resinous; the precipitate is not uniform in its composition unless certain precautions are observed; when a resinous precipitate is formed, a larger quantity of Mayer's solution is necessary to finish the test.

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* From the *American Journal of Pharmacy*, October.

† 'Die chemische Werthbestimmung einiger stark wirkenden Droguen.' Von Dr. G. Dragendorff. St. Petersburg, 1874.

‡ 10 c.c. were allowed to evaporate spontaneously under a desiccator; the residue weighted 0·123.

0·09332 nicotine correspond to 0·1215 sulphate of nicotine.

As the object is to obtain a precipitate of definite composition—$HgI_2,C_{10}H_{14}N_2(HI)_2$—the formation of any resinous precipitate must be avoided. To prevent this, at the beginning a large quantity of Mayer's solution is added at once, and the resulting mixture is briskly stirred until a crystalline precipitate begins forming.

The quantity of acid added to the nicotine solution seems also to have influence; if it is small a resinous precipitate is more apt to be formed. One drop of strong hydrochloric acid for each 10 c.c. of nicotine solution acts very well; more acid (2 or 3 drops for 10 c.c.) did not seem to influence the quantity of Mayer's solution required.

According to Dragendorff—

19·3 c.c. of M. S. in A. would indicate 0·07816 nicotine,
22·5 c.c. „ in B. a. and b. „ 0·091125 „
17·4 c.c. „ in B. c. „ 0·07047 „
and the precipitate in A. should amount to 0·4207
„ in B. a. and b. „ 0·490
„ in B. c. „ 0·380

while there was obtained, respectively, 0·724, 0·866 and 0·645, or on an average 73 per cent. more than Dragendorff accounts for.

	Volume of nicotine solution.	Amount of nicotine.	Quantity of M. S. required.	Weight of precipitate.	Liquid off precipitate. Amount of Hg as HgS.	Liquid off precipitate. Amount of I.
Hydrochloride of nicotine.	A.					
	1. 40 c.c....	·3148	38·7 c.c.	1·461	0·052	
	2. 40 c.c....	·3148	38·3 c.c.	1·442	0·055	
	3. 20 c.c....	·1574	19·3 c.c.	0·718	0·027	
	4. 20 c.c....	·1574	19·5 c.c.			
	5. 20 c.c....	·1574	19·2 c.c.			
	6. 20 c.c....	·1574	19·25 c.c.	0·727	0·028	
	7. 20 c.c....	·1574	19·3 c.c.	0·723	0·027	0·315
	8. 20 c.c....	·1574	19·25 c.c.	0·718	0·027	
	Average for 20 c.c. of nicotine solut.		19·3 c.c.	0·724		
	B. a.					
	20 c.c....	·1866	22·6 c.c.	0·862		
	20 c.c....	·1866	22·4 c.c.			
Sulphate of nicotine.	B. b.					
	1. 20 c.c....	·1866	22·6 c.c.	0·870	0·026	
	2. 20 c.c....	·1866	22·7 c.c.	0·871	0·028	0·352
	3. 20 c.c....	·1866	22·4 c.c.	0·862		
	Average for 20 c.c.		22·5 c.c.	0·866		
	B. c.					
	20 c.c....	·1398	17·4 c.c.	0·645		

Composition of Precipitate.

1·000 of A. 2 yielded 0·270 HgS and 1·085 AgI = 0·586 I
0·718 of A. 3 „ 0·197 HgS and 0·773 AgI = 0·418 I
0·723 of A. 7 „ 0·197 HgS and 0·785 AgI = 0·424 I.

0·197 HgS correspond to 0·385 HgI_2 with 0·215 I.

0·385 HgI_2 deducted from the precipitate, that is from 0·723, leaves 0·338 for acid hydriodide nicotine.

0·215 I deducted from the entire amount of I found in precipitate, from 0·424, leaves 0·209 I, which is as HI in combination with nicotine.

0·723 precipitate give by calculation 0·376 HgI_2 and 0·347 $C_{10}H_{14}N_2(HI)_2$ with 0·210 I.

0·755 of precipitate B. b. 2 yielded 0·205 HgS and 0·820 AgI, or for 0·871 (the entire precipitate) 0·236 HgS and 0·945 AgI with 0·510 I.

0·236 HgS correspond to 0·461 HgI_2 with 0·258 I.

0·461 HgI_2 deducted from the amount of precipitate, from 0·871, leave 0·410 for acid hydriodide nicotine.

0·258 I deducted from the entire amount of I found in precipitate, from 0·510 leave 0·252 I, which is as HI in combination with nicotine.

Calculation requires for 0·871 precipitate 0·4534 HgI_2 and 0·4176 and hydriodide of nicotine with 0·2537 I.

From these investigations it appears that the composition of the precipitate is $HgI_2,C_{10}H_{14}N_2(HI)_2$.

The presence of nicotine in the liquid, filtered off the precipitate after Mayer's solution had ceased to give a precipitate, is evidence that a part of the combination formed is kept in solution, which is easily ascribed to the excess of potassium iodide in Mayer's solution. Dry precipitate, which is very little soluble in pure or acidulated water, dissolves to a greater extent when iodide potassium is added to the water.

But as with a certain quantity of Mayer's solution a precipitate ceases to be produced by addition of more, we have a right to assume that the nicotine found in solution is in the same combination as in the precipitate, and from the quantity of mercury in solution the quantity of nicotine can be ascertained.

By calculating the combination in solution from the amount of HgS found, and adding the amount to the precipitate, we obtain nearly double the amount that Dragendorff claims to obtain.

The quantity of nicotine indicated by 1 c.c. of Mayer's solution has to be taken therefore as 0·0081, or one-half equivalent.

From among the many perplexing and embarrassing results which were obtained, it is my purpose to mention only a few to prove the assertion that when a resinous precipitate is formed, more Mayer's solution is required to finish the reaction.

20 c.c. of A. required 22 c.c. of Mayer's solution when the precipitate was resinous at first.

20 c.c. of B. c. required 25·7 c.c. of Mayer's solution, the precipitate having formed resinous except towards the last.

20 c.c. of B. c. furnished a resinous precipitate until 23 c.c. of Mayer's solution were added; the liquid was then decanted and more Mayer's solution added until it ceased to give precipitate; it required 3 c.c. more.

0·690 of the concrete resin gave 0·200 HgS, corresponding to 0·391 HgI_2, an amount much larger than in the successful experiments.

To 20 c.c. of B. c. were at first added 12 c.c. of Mayer's solution; the crystalline deep yellow precipitate was collected on a tared filter, washed and dried; to the liquid more Mayer's solution was added until it ceased to give precipitate; 10·4 c.c. were required. The second precipitate was also collected on a tared filter, washed and dried, and from the liquid the Hg was precipitated by H_2S, yielding 0·033 HgS.

First precipitate weighed 0·482
Second „ „ 0·353

In regard to the circumstance that a more dilute solution of nicotine requires more Mayer's solution than one of a certain concentration, it is my impression that it is owing principally to the formation of resinous precipitate, which is more apt to be formed in very dilute solutions. The resinous precipitate has a different composition from the regular crystalline precipitate, and contains proportionally a larger amount of HgI_2. Experiments made with dilute solutions of A. and B. showed that the more resinous precipitate is formed the more Mayer's solution was required.

A solution for testing ought to contain at least 0·5 per cent. of nicotine to obtain correct results.

COCAINE AND ITS SALTS.*

BY E. MERCK.

Cocaine, $C_{17}H_{21}NO_4$ (according to Lossen), is the alkaloid contained in coca leaves (*Erythroxylon Coca*, Lam.), which was first isolated by Niemann in 1860. In 1862, Lossen discovered in the same leaves a second principle, hygrin, which is of a volatile nature, and has been hitherto but little investigated, but it appears to have a weak and hardly characteristic action. The further

* Abstract from a paper communicated by the author

component parts of the coca leaves appear to be ecgonin, coca-tannin, and a peculiar wax.

The cocaine crystals belong to the monocline system, melt at 98° C., are easily soluble in alcohol, even more easily soluble in ether, but only dissolve in 704 parts water. The salts of cocaine are, on the other hand, readily soluble in water. The salts prepared commercially are the hydrochlorate, salicylate, hydrobromate, tartrate and citrate.

The first reports as to the results of the internal use of coca leaves have been handed down from the sixteenth century (Dr. Mondedes, Seville, 1569). In 1749 the plant appears to have been first brought to Europe. It was described by Jussieu and was named *Erythroxylon Coca* by Lamarck.

Tschudi, Markham, Popp'g, and others, who have travelled in South America, found that the natives were in the habit of chewing coca leaves as a remedy for, or preventive against, the effects of extraordinary physical exertions.

The Indians chewed the leaves in conjunction with the ashes of *Chenopodium Quinoa*, the alkali contained in which seems to have eliminated the tannin from the coca leaves, and to have left the alkaloid free.

Since the discovery of cocaine the belief has gained ground, and, as it appears, quite correctly, that this alkaloid is the really active principle of coca leaves. At first it was believed, apparently with good grounds, that it possessed a property analogous to that possessed by caffeine, theine, and theobromine, viz., the power of retarding or stopping the change of tissue, but hitherto no facts absolutely confirming this theory have been discovered. Administered in small doses cocaine has an exhilarating effect, but in larger doses it paralyses the nerve centres and other parts of the nervous system. It has a fatal effect on warm-blooded animals (which are, however, apparently less affected by it than are cold-blooded creatures), by causing a cessation of respiration: it would therefore appear that cocaine is a poison, though its toxic qualities appear to be very mild and its action not cumulative.

Schroff, who made the first experiments with cocaine in 1862, observed that doses of 0·05 gram administered internally to rabbits caused considerable variation of the pulse and in the breathing, as also temporary mydriasis; the same dose administered subcutaneously caused death in convulsions of an epileptic nature, mydriasis in a strong degree being also observable, which, however, disappeared at once after death. In the case of frogs a dose of 0·001 gram produced complete immovability (preceded by a prior appearance of excitement); a dose of 0·002 gram proved fatal to frogs.

According to Froumüller, who made experiments in 1863 with a view of testing the narcotic effects of cocaine, a dose of 0·03–0·33 gram, internally administered, seemed to have no important effect upon human beings; in some cases sleep resulted, pulse and breathing at first somewhat accelerated, but afterwards became slower than under normal conditions.

In a case of attempted suicide a dose of 1·5 gram seemed to have no seriously injurious effect; the fatal dose, therefore, for human beings would appear to be very considerable.

As far as experiments with the infusion of coca leaves have hitherto gone they would appear to show that the coca leaves contain from 0·02 to 0·2 per cent. of cocaine; 0·05 gram of cocaine hydrochlorate seems to be the suitable dose for human beings.

The effects of subcutaneous injection of a solution of cocaine, on human beings appear to be, first, a feeling of warmth, then insensibility to feeling in the neighbourhood of the part in which the injection has taken place, and, finally, a reddening of the skin. After a lapse of thirty minutes matters appear to resume their normal condition.

Cocaine placed on the tongue seems in some cases to deaden the action of the nerves. Dr. Th. Aschenbrandt states that he has found cocaine to have an excellent effect upon the human frame exhausted by diarrhœa. During the last few months Professor E. V. Fleischl, of Vienna, has affirmed that cocaine in the form of a subcutaneous injection is undoubtedly a valuable adjunct in preventing and curing the craving for morphia. This circumstance alone should be sufficient to ensure for cocaine a lasting position as a valuable article of medicine.

In cases where the treatment can be prolonged decreasing doses of morphia and increasing doses of cocain, and in cases where rapid treatment has been decided upon doses of 0·1 gram of cocaine alone are subcutaneously injected as often as the craving for morphia becomes apparent. Dr. Frend, who, amongst other instances, completely cured a case of craving for morphia within ten days by means of doses of 0·1 gram of cocaine subcutaneously injected three times daily, is of opinion that morphia and cocaine act antagonistically to each other.

The treatment of dypsomania seems to be comparatively much more troublesome; the first attempts appear to have been made in America and to have resulted fairly favourably. Cocaine has also been recommended as an aphrodisiac, and Dr. Frend seems to have certainly observed symptoms of sexual excitement after its administration.

As already observed, cocaine brought into immediate contact with the mucous membrane seems to produce temporary insensibility to feeling, and trials have been made with it not only in cases of disease of the throat, windpipe, etc., but results have also been obtained in the direction of producing local anæsthesia for the purpose of operations on the mouth, throat, etc. Cocaine will also probably come into important and frequent use in cases of ophthalmia.

On September 15 of this year, at the meeting of ophthalmologists at Heidelberg, the experiments made by Dr. Koller in Vienna were fully discussed. This gentlemen experimented on various occasions on the eyes of animals and also upon his own eyes, and found that immediately after the introduction, by dropping, of a 2 per cent. solution of cocaine hydrochlorate a burning sensation in the eye lasting for about half a minute resulted, which was followed by an indefinite sense of dryness, the opening between the lids of the eyes under treatment appeared to be wider, while the tendency to shrink back, which would otherwise manifest itself on the cornea being touched, for instance, a twitching back of the head or of the eyelids, or the tendency of the eye to draw back on being touched, seemed to disappear, so that in this condition it was possible to produce by pressure a dimple on the cornea, or even to lay hold of the conjunctiva bulbi with tweezers without producing any unpleasant sensation. This absence of feeling on the part of the eye continued for about ten minutes, but a certain lack of its usual sensibility continued for several hours. Twenty to thirty minutes after the introduction of the solution of cocaine hydrochlorate the pupil became enlarged, returning after some hours (at longest apparently after twelve hours) to its normal condition.

A slight difficulty in accommodating the two eyes to each other, which could, however, be easily overcome by an effort, was the only abnormal symptom observed during this period; otherwise the functions of the eye remained intact.

Which of the cocaine salts is preferable for the purposes of eye surgery remains to be proved, and will probably be positively ascertained very shortly. It remains to observe that the experiments, the results of which have been detailed in the foregoing were without exception made with the cocaine hydrochlorate; but it seems beyond doubt that the effects of other cocaine salts agree with the observations made in the case of cocaine hydrochlorate.

Dr. von Hoffmann, of Baden-Baden, an ophthalmologist, recommends cocaine salicylate for ophthalmic purposes.

Cocaine citrate has been successfully used by dentists for the purpose of anæsthising the dental nerves. This salt can be readily formed by kneading into pills, which, after being wrapped in wadding and moistened, are placed in the hollow tooth, which can then be cleaned or extracted comparatively, or even totally, without pain.

Cocaine splits up with concentrated hydrochloric acid into ecgonine, benzoic acid and methyl alcohol. Experiments are now being made as to the physiological action of ecgonine.

TENGKAWANG FAT, OR VEGETABLE TALLOW.*

BY H. P. BAKKER, OF SANGGAU.

(*Concluded from page* 409.)

Here at Sanggau the tengkawang fruit are treated in another manner. Directly after the gathering the shell is broken, the pulp is cut into slices and these are dried in the sun, to obtain from the product thus treated, which must then be immediately pressed, the so-called "minjak tengkawang Soentie." This is considered the finest of the tengkawang tallows, and is only made in small quantities for private use, viz., for culinary purposes. The quantity of tallow obtained in this manner is, in proportion, much less than when the tengkawang is treated according to the wet system. Hence it is seldom applied.

Let us now examine in what manner the native separates the tallow from the paddi tengkawang.

He begins by pounding the paddi. This is often done in the common rice-block with the rice-pestle; but sometimes the pestle is made of a short heavy piece of wood, fixed to a long pole, placed horizontally, and turning in the middle round a horizontal axis; then they tread upon one end, which raises the stamper, and upon being let loose the stamper falls into the block.

When the pounding is done the tallow is to be expressed. For this two arrangements are required, one to seethe the meal and one to press it. This seething and pressing is done simultaneously.

For the seething a long hollow wooden cylinder is used, in which a loose bottom of split bamboo at a little distance from the base is placed, and then closed at top with a wooden cover. This is suspended with its base over the water of a large iron pan, in such a manner that the bottom does not reach the water. It is then filled with tengkawang meal and closed, after which the water is made to boil. The steam then mounts into the cylinder and penetrates to the meal, which becomes more compact and sinks; then the cylinder is filled up again with meal, and when all the meal is thoroughly heated to the top, it is ready to be pressed. To render the spreading of the steam as regular as possible, a piece of bamboo is fixed in the middle of the cylinder vertically over a hole in the bottom, the sides of which are perforated here and there.

The size of the cylinders is various. Some hold as much as 75 catties of meal.

The press is more than a fathom high, and consists of two horizontal beams, one of which rests on the ground, and connected to each other with supports. In the upper beam is an oblong square vertical aperture or groove, in the lower one a square hole. Between these two beams are two heavy pieces of wood, placed with their broad flat sides towards each other. They are hewn thin at the extremities, and rest with one extremity in the hole of the lower beam, while the other extremities are enclosed in the above-mentioned groove, in which they can be moved towards and from each other. At the inner side of each is a notch running slanting downwards, in such a manner that if the pieces of wood are brought together with their flat sides against each other, the notches tally. If, now, you proceed to press, the two pieces must be placed so as to form a V; in the notches an "oepeh" (sheath of the pinang) is bound, forming a slanting gutter protruding out of the press; then a bag filled with hot tengkawang meal is laid between the press above the pinang sheath, and then the two pieces of wood are driven together by means of quoins which are driven into the mentioned groove. The fluid grease then flows from the bag into the pinang-sheath and so out of the press, and is caught up in limbs of bamboo, or in a sort of tubs made of bark. The press bags must be made of plaited ratan, otherwise they are like to burst. The driving of the quoins is hard work, and the two men who do this place themselves for that purpose upon the upper beam.

If the tallow is intended for culinary purposes it must be strained.

After the first pressing, the ratan bag is taken out of the press, the meal that is in it, well shaken, and replaced with the top side under. After a second pressing all the fat is far from being expressed, and therefore the pressed meal is sifted, the finer part thrown aside and the coarser is again pounded, seethed and pressed. Three or four persons can seethe and press about 3 piculs of meal in one day.

It is evident that after this operation there must still remain some fat in the refuse that is thrown away here, and that one working with better appliances will get from the same quantity of paddi more fat than the native.

The paddi tengkawang differs considerably in weight and proportion of fat. The heaviest and richest is that produced from sound fruit that have not germinated, and have lain from thirty to forty days in the water. Such paddi tengkawang weighs 3 piculs per 100 gantangs, and yields 120 catties of tallow. The tallow of the tengkawang fruits that were either not sound or partially germinated, or have not been steeped long enough, is lighter, so that the weight of 100 gantangs of the paddi varies from 230 to 300 catties, but amounts, on an average, to 270 to 280 catties. From this inferior minjak is also obtained.

The proportion of tallow in the four sorts of tengkawang proper is about equal, provided the fruit be properly treated. Now, however, we have seen that the fruit of the *T. lajar* often lie on the ground till they germinate, which has an injurious effect on the quantity of fat. This paddi is mostly mixed with that of the *T. rambei*, and an equal weight of this mixture yields less tallow than the same weight of good paddi of the *T. toengkoel*.

We have now considered how the paddi and minjak tengkawang are prepared, and we shall have something to say further on about their importance in commerce. For the present we will return to the "madjau" and "meridak" mentioned above.

These trees grow wild, by preference along the banks of smaller rivers in marshy ground, but are also found occasionally further up from the banks. People do not plant them.

They are big tress like the tengkawangs proper, but their wood is more durable, and they do not perish from inundations. The madjau-wood is made into "sampans" (a sort of craft) and planks, while the terindak wood, which is heavier than water and much resembles the favourite "tekem" wood, is applied to manifold purposes. It is hard and proof against damp.

The fruits are of almost the same shape as those of the tengkawangs proper, but are much smaller; those of the "madjau" are about an inch thick, those of the "terindak" are of the size of a coffee berry.

Both these trees do not, indeed, bear every year, but yet more frequently than the tengkawangs proper. In the years when these produce fruit, little trouble is taken

* From the *Indian Mercury*. Reprinted from the *Tropical Agriculturist*.

to gather them. As the trees generally hang over the water, a part of the fruit fall into it and float away till they are stopped by some obstacle or other; here they collect into a heap and are scooped up by the natives. The fruits of the two sorts are thus commonly mixed up together.

The fruit that fall on the ground are allowed to remain there in the tengkawang years, but when the tengkawang proper does not bear they are collected. The underwood is first cut away and all the leaves removed so as to leave the ground quite clean. As the fruit are too small to pick them up one by one, they are not gathered every day, but only when a sufficient quantity has fallen to sweep them together. Thus the fruit have often partly germinated, which is injurious to the produce.

The fruit are then also steeped in water, either for a longer or shorter time according as they have germinated or not. The wet fruit being first dried, the shells with their appendages are loosened by stirring and pinching them well in a "bakoel" (a kind of basket) with the hand, and then removed by sifting or winnowing.

The paddi of these sorts is treated in the same manner as the tengkawang proper to get the tallow from it.

The proportion of tallow in the paddi of "madjau" and "terindak" is much smaller than that of the paddi of tengkawang proper, and may be computed at about one-sixth of its weight only.

If the "madjau" and "terindak" are worked separately, and the fruit be not allowed to germinate, the tallow obtained is of a very good quality, but always softer and of less value than that of the tengkawangs proper. "Madjau" tallow is of a lighter colour, "terindak" tallow greener.

Of old the tengkawang tallow was used by the natives for lighting, further mixed with resin, for calking vessels; and lastly as a condiment with rice, or for preparing condiments. The fat required for this last purpose every one used to make for himself as much as possible, and employed the best fruit, which were carefully treated. The fat of the "madjau" and "terindak" is not fit to eat.

As the demand for the tallow increased, people began to adulterate what was intended for exportation.

It is a lamentable fact that traders of these countries are so apt to bring adulterated and sophisticated productions to the market. Nor has tengkawang tallow escaped their inventiveness in this way; powdered earth fruit and water was mixed up with it. The tallow when still fluid can bear one-third of its volume of water being mixed with it, without its being easily perceptible when solidified, unless in burning, for then it will splutter. The delicate yellow colour is indeed lost by such a commixture, but this can be restored more or less by several artificial means.

The tallow that was exported used to be made either entirely of the paddi of *T. toengkoel*, that is kept and worked separately, or else of a mixture of different tallows from the *T. lajar* and *T. rambei*, and sometimes also of "madjau" and "terindak." An examination into the physical and chemical properties of the tallows could, therefore, never lead to definite results. To be able to do this properly, it would be necessary to buy up a certain quantity of each sort at the time of the gathering and to work these separately.

Up to the year 1878 it remained a regular thing to export the tallow. It was bought up here for 6 dollars to 7 dollars per picul, whereas the price of the paddi tengkawang amounted to 4 dollars to 7 dollars per 100 gantangs.

In the said year, however, a complete revolution took place in the tengkawang trade. Sundry Chinese began then to buy up the paddi tengkawang, and thence the price of this article rose to 10 dollars the 100 gantangs, or about 3·50 dollars per picul; however, the greatest quantity was bought up for less, and disposed of with great profit by the purchaser at Singapore. This fact soon became known, and the price of the paddi tengkawang of such a nature, that the preparation of the tallow for private use could no longer yield any profit, and every one, therefore, was eager to sell it.

Add to this that the native began to feel the want of the tallow less. Petroleum as a lighting oil had already superseded it in a great measure; also cocos, cocos-oil and other ingredients for culinary purposes had become of easier acquisition than formerly, and had partly rendered the use of tengkawang tallow for that purpose superfluous. So the want of this tallow for the native household was very much diminished, and this was an additional reason for the native to be eagar to sell his tengkawang.

In 1878, I believe, only paddi tengkawang was exported from the Kapoeas territory which was duly prepared after the wet system. The converting of this to tallow and other matters by European industry must, therefore, have yielded good results.

Allured by the profits obtained by some in 1878, a fierce contention took place among the different Chinese and Malay traders, as to who should first buy up the greatest quantity of paddi tengkawang; and the consequence was that the price rose to 4 dollars per picul.

The price of paddi "madjau" and paddi" terindak," however, was, as formerly, lower than that of the tengkawang proper. This paddi is also less exported.

The natives seeing that the purchasers attend less to the quality, and hearing that the paddi after the dry system produced as much in the Landak, began to slight the process. Some allowed the fruits to remain but a very short time in the water, say eight or ten days, and dried them at once; such paddi must, therefore, be sooner infested by the "boeboek." Several sorts were mixed up together and even with paddi of "madjau" and "terindak," even the paddi that was far from being sufficiently dried was bought and put into goeme bags —the ordinary way of packing; no wonder that the product arrived half rotten at Singapore. Nor could the Malayan resist the temptation to adulterate, and he mixed his paddi here and there with worthless wild fruits.

That the paddi tengkawang prepared after the wet process is better than the other, seems also to be already known to the trade. At least the Chinese traders say that at Singapore the former is worth 20 dollars per koyang of 40 piculs more than the latter.

Whether the long continued action of the water does really increase the proportion of tallow is a point that well deserves further investigation. But be this as it may, the first mentioned sort has this advantage, that it is only after a considerable time that it is attacked by the boeboek, a circumstance of great importance in sending the product over sea.

The traders have suffered pretty considerable losses this year. Only a few have any knowledge about tengkawang; they will have to be more careful in future in their purchases. It is rather difficult, but for people well acquainted with the article, it is not at all impossible, to distinguished the duly prepared paddi tengkawang from the inferior sorts.

If the advantage of the wet process be acknowledged, it would besides be worth consideration, where the natives follow the dry system, to point it out to them, and persuade them to abandon that method.

The profits which the tengkawang yields to the native population are so great, that it is well worth while to encourage further planting and a proper working of the product. The first, indeed, is not necessary in the Afdeeling Sanggau and Sekadau, for the population there do plant of their own accord; but, as has already appeared, their *way* of planting and their maintenance of the plantations, leave room for improvement. On the other hand, now the people have once departed from the good old way of working, it will perhaps cost some trouble to get them to return to it again.

To judge of the profits derived from the tengkawang by the population, we give the following figures. From the *Afdeeling* Sanggau and Sekadau a quantity of more than 23,000 piculs of paddi tengkawang has been already exported, for the purchase of which, according to a fair calculation, a sum of 75,000 dollars was required. Besides this some traders have a large store, and the population have also used a part for preparing tallow, so that the crop of this year in these parts may be safely stated as representing a value of, more or less, 100,000 dollars.*

The tengkawang crop is, then, for many natives, an ample source of revenue, and is becoming of more and more importance for them, as getahs and ratans are becoming scarcer.

Before concluding this article, I wish for the sake of completeness, to add a few words about a couple of other fruits occurring here, that also contain fat, namely :—

The "belaban or "melaban,"
the "kelakki" and
the "tengkalak" or "malih."

The "belaban" and "kelakki" trees grow in marshy ground, especially along the banks of smaller rivers. They are rather big, and the belaban wood especially may be reckoned among the good sorts. This wood makes the best short oars, the kelakki long oars.

The fruit of the kelakki have the size of a nutmeg; the outer shell loosens of itself and discovers then one, two or three small fruit, enveloped in two more skins. The outer of these skins, when dried, is loosened by slightly pounding; the interior will only loosen by boiling; then there remain oblong white kernels or pips, from which fat can be extracted.

The belaban fruit are of the size of a coffee bean. In the shell are a few small kernels from which fat can be procured. These two fruit are never steeped in water, but simply dried.

The trees are not planted.

As with the madjau and terindak, the fruit fall for a part into the water, whence they are taken out by the natives. If the belaban fruit fall to the ground it is not considered worth while to pick them up.

The proportion of fat in these two sorts is much below that of the tengkawang proper; the tallow of the belaban is moreover bad and soft, and only fit for burning. The minjak kelakki is fluid in all temperatures prevailing here, and when it is prepared with care, clear, of a sweet taste, so much so that it is even preferred for culinary purposes to tengkawang tallow. If, however, the fruit are allowed to germinate, the interior skin is apt not to disengage itself, and the oil becomes turbid or bitter.

These two fats are only made for private use and are not exported.

Of the tengkalak or malih a description is found in Van Gorkom's work 'de Indische Cultures,' vol. ii., p. 623, seqq.

I therefore only wish to observe that the tree does not occur here in a wild state, but always cultivated; also that no tallow is ever prepared from the kernels, or very seldom, and that the wood is quite worthless here.

This last circumstance is probably owing to there being plenty of good wood in these parts, while the reason for not extracting the tallow is that the number of trees is too insignificant, and the proportion of fat in the kernels less than the other fat-producing fruits.

* According to an official writing of the Resident *pro tem.* of the Western *Afdeeling* of Borneo, 10,550 piculs were exported thence in 1856, and according to a later account of Professor de Vriese, the export from Pontianak alone amounted, from the middle of 1858 to the middle of 1859, to no less than 9953 piculs, representing on the spot a value of *f* 232,595. "If you add to this" says the learned gentleman, "the exports from Singkawang, Sambas, Bandjermassing, an important annual total is obtained that slips from the Dutch trade to the great profit of the Singapore trade."—Bisschop Grevelink, 'Planten van N.-Indic,' bldz. 457.

PERSIAN OPIUM.*

BY CONSUL-GENERAL BENJAMIN, OF TEHERAN.

Some years ago the production of opium in Persia was larger than at present. The unusual proportion of morphia which Persian opium contains made it justly preferable to that produced elsewhere, and large quantities found their way to foreign markets, and especially to China.

Two causes have latterly tended to check the culture and export of Persian opium, although the trade in the article is still important. One of these causes alone might not have led to such a result, but the two coming about the same time have somewhat discouraged the production of Persian opium. These causes were, the increasing adulteration of the article and the fact that the attention given to its culture materially reduced the more important culture of wheat, which led the Government to regard the opium product with disfavour.

Persian opium is chiefly grown in the provinces of Kermanshâh and Ispahân. The latter city is the centre of the opium trade of Persia. The opium of Ispahân is the best; the highest grade has been found to contain 15 to 16 per cent. of morphia. It is fair to state, however, that of late the opiums of Kûm, Teherân, and Yezd have been growing in favour, some specialists considering the quality raised at Kûm as surpassing every other grade of opium. As the highest quality of Smyrna opium does not contain a mean of over 13·57 per cent. of morphia, some analyses placing it even lower, while the Persian drug yields at its best 13 to 16 per cent. of morphia, hard, it certainly rivals that of Smyrna, and is beyond question far superior to that of Egypt and India.

The chief objection to the opium of Persia lies in the adulteration to which it is subjected, the chief ingredient in this deterioration being grape-must, and sometimes small stones concealed in the parcels. This difficulty could be remedied by any enterprising house which, through honest. capable agents, could purchase the entire product of Persia, or of any one of the opium producing districts, and give direct attention to the preparation and packing of the drug. A pure article could also be obtained by a firm ready to form a contract for a certain quantity of a given grade of the drug for a term of years, the continuance of the contract depending on the non-varying proportion of morphia in the exported article.

The average price of the opium of Persia, in its crude state, is now 4 dollars 77 cents. per kilogram. To 72 kilograms of opium are added 6 kilograms of linseed oil. The mixture is then subjected to a manipulation which reduces the 77 to 66 kilograms. These 66 kilograms are divided into one hundred balls, forming a Persian package. A specified number of the balls of opium make a case. The cost of packing, freight, and other incidental expenses bring the average price of a case of Persian opium, such as is prepared for export, up to 366 dollars 66 cents. The excise duties vary at different centres of the trade, but 5 per cent. *ad valorem* is the uniform rate according to the treaty of Turkomontchai on all goods exported to Europe or America, and, I may add, on all goods imported from those countries into Persia.

It is stated that two thousand cases of opium, valued at 732,000 dollars, are now exported from Bushire to England, besides what finds its way to China and other quarters from the other districts of Persia. There is no doubt that if sufficient encouragement were offered, especially by the establishment of agencies at Ispahân or Teherân, or by making permanent contracts, the product could be easily increased and the purity of the exported article improved. Indeed the opium merchants of Ispahân have already made overtures for the American trade, and are prepared to make contracts for a term of years.

It is proper to state inquiries made of practising physicians at Teherân, including an American physician, elicit the highest opinions in favour of the opium of Persia as regards the character and quantity of morphia it produces when unadulterated.

* From the *Independent Journal.*

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 29, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE BENEVOLENT FUND.

THE present number of the Journal brings the subject of the Benevolent Fund under the notice of our readers from two points of view. On one page it contains an official notice giving satisfactory evidence that the Fund is in a healthy condition and is being utilized to confer benefits probably far exceeding the most sanguine expectations of the founders. On another will be found a letter from Mr. E. B. VIZER, calling attention, as these columns have done on many a previous occasion, to the fact that a large number of registered chemists and druggists do not contribute in any way to the Fund. Both of these phases are worthy of attention, but whilst not thinking the appearance of Mr. VIZER's letter inopportune,—since we regret with him the inexcusable abstention which he emphasizes,—we are disposed on the eve of the election of six more annuitants to prefer the former and regard with a considerable amount of satisfaction what is actually being done by means of the Fund. The election on Friday next will place six more deserving persons in the receipt of annuities of thirty or thirty-five pounds each, according to their age, in addition to the thirty-nine persons at present in the enjoyment of similar annuities; and the annual expenditure of upwards of fifteen hundred pounds thus involved, together with about half as much more spent in the form of casual relief, represents an amount of help given and distress alleviated which it is impossible to measure and cannot be said to be unworthy of the calling. Indeed, it may be that a very praiseworthy desire to still further extend the scope of the Fund occasionally blinds our eyes a little to the fact that a sum of at least two thousand pounds sterling is being spent yearly in Great Britain in the relief of distressed persons who have been, within certain limits, connected with the calling of a chemist and druggist.

Nevertheless, we quite agree with Mr. VIZER in considering that the statistics he quotes are "by no means satisfactory or creditable to the trade at large." It certainly does seem surprising that out of thirteen thousand persons whose names are on the official register of chemists and druggists so large a proportion as eleven thousand do not contribute in any way to a Fund upon which any of them may legitimately put forward a claim should misfortune overtake him. It may be admitted, of course, that not a few of this number fairly consider themselves prohibited from contemplating the Fund from any other point of view than as a possible source of help to which they may sooner or later have to appeal. But after deducting all that could legitimately assume this position, there must be a very large residuum of registered chemists and druggists who have never yet felt constrained by duty or inclination to subscribe to the Fund. The day is long past when ignorance as to the existence and nature of the Fund could be pleaded, for time after time, when a favourable opportunity has presented itself, information and urgent appeals have been sent to every person on the Register. Neither are we willing to attribute the abstention, in any considerable degree, to uncharitable indifference. Such explanations are indeed almost precluded by the figures quoted by Mr. VIZER, which show that the abstentions are by no means uniformly distributed through the country. But the fact that in some localities nearly all the chemists and druggists give something, whilst from others hardly any returns are made, indicates, in our opinion, how much depends in every district upon the local secretary or some other influential person taking a personal interest in the collection of subscriptions.

This brings us to one of the questions propounded by Mr. VIZER, and which we presume was embodied in the letter that he refers to as having been under the consideration of the Council at its last meeting. Assuming that it cannot be expected that the work should be done satisfactorily by local secretaries, Mr. VIZER asks whether it would be well to employ paid collectors, known to and under the supervision of the local secretaries, to obtain subscriptions. This proposition we are disposed to meet with a direct negative and for two reasons. The first is, that such an arrangement would entirely alter the character of the administration of the Fund, which up to the present has been purely honorary, so that the whole of the income, subject to a relatively very small deduction for such expenses as stationery, printing and postage, has been available for disbursement in benevolence. Secondly, considering that such an arrangement would inevitably involve payment of collector's poundage upon a large sum at present collected inexpensively, it is open to question how far it would be financially profitable. The next suggestion made by Mr. VIZER, that the claims of the Fund should be made known through the post to every registered chemist and druggist at least once a year is already in operation, and, indeed, is exceeded. Possessing, necessarily, a fair knowledge of the facts, and with little favour for a "rest and be thankful" policy, we confess, after a careful consideration of the whole subject, that we in-

cline to the conclusion that the limit of what can be judiciously and economically done by the Council in this direction has been pretty well reached, and that the further development of the Fund must be left, to a great extent, to spontaneous and above all disinterested local effort.

A meeting for the election of six annuitants from the Benevolent Fund of the Pharmaceutical Society will take place on Friday next, December 5, at noon, in the Society's House, 17, Bloomsbury Square. As on previous similar occasions, we are desirous of calling attention to the fact that the examination of the voting papers involves the scrutineers in a very large amount of work and of suggesting that this may be made more tolerable by the early attendance of as many subscribers as possible who are willing to serve in that office.

* * *

On Wednesday evening next there will be an Evening Meeting of the Pharmaceutical Society at 8 o'clock, when a paper on "Liquid Extract of Cinchona," by Professor Redwood, will be read. We understand also that several interesting donations to the Museum will be placed upon the table.

* * *

The address of Dr. Sheen on the relations of the medical profession, to which we referred a fortnight since (p. 390), is the subject of some correspondence in the *British Medical Journal* for the 22nd inst., one of the writers, Dr. J. Haddon, expressing an opinion that "Parliament must prevent the surgeon from dispensing and the druggist from prescribing." The same number contains on the opposite page a pertinent commentary upon the claim put forward by Dr. Sheen as to the superiority of medical dispensing. Mr. John Gould, of Hatherleigh, writes that wishing to give a grain dose of permanganate of potash in the form of a pill, he proceeded to make it up with honey, when he was surprised by the mass bursting into a flame, whereupon he substituted glycerine, but with a similar result. He adds, "I am ignorant of the nature of the rapid chemical change that took place in the above experiment and should be much obliged if any of your numerous chemical correspondents would enlighten me upon it."

* * *

In recent meetings of the Charleroi Union Pharmaceutique the question has been discussed whether a Belgian pharmacist is under obligation to supply a specialty prescribed by a medical man, when the formula was not given, and, if not, whether he might supply in its place a preparation made by himself according to some published formula. It appeared to be thought that the first part of the question was answered in an existing legal provision that when a medical man prescribes a magistral preparation not recognized in the official pharmacopœia he shall, in order to prevent mistakes, designate the dispensatory or pharmacopœia in which the preparation is included. In answer to the second part, another regulation was quoted which enjoins that prescriptions shall be dispensed and the chemical and pharmaceutical compounds used in them prepared, either by the pharmacists themselves or under their surveillance. It was eventually agreed that a letter should be addressed to the local medical commission, asking that, in the interests of the public, the attention of the medical men of the province might be directed to their obligations in this respect.

* * *

Professor Norbert Gille, who it may be remembered attended the International Pharmaceutical Congress in London in 1881 as a delegate from the Belgian Government, has been recently elected, by thirty out of thirty-one votes, Vice-President of the Royal Academy of Medicine of Belgium.

* * *

According to the Antwerp *Journal de Pharmacie* during the last four years the number of pharmacists in Belgium has risen from 1025 to 1140. This increase of 115 competitors for a livelihood appears to cause considerable anxiety to our contemporary, who demands that the obtaining of the diploma shall be rendered more difficult than it now is, and that existing pharmacists shall be ensured the position which the Legislature of 1818 intended they should hold.

* * *

The subject of "refilling" prescriptions is just now undergoing discussion in the pharmaceutical press of the United States, the prevailing opinion being in accord with that which we have more than once expressed, that it lies with the prescriber to give definite instructions upon the point. The *National Druggist* mentions with approval that the prescription blanks of a well-known physician bear at the bottom the words, "This prescription not to be refilled or a copy thereof given without the written order of Dr. ——." The *Weekly Drug News* says, "With regard to the refilling of prescriptions we think the matter rests entirely with the physician and the patient. The patient receives the prescription from the physician as bought and paid for. He naturally may claim the right to a copy of it for future use, except where he accepts it with the stipulation that it shall be used but once. If he does accept a prescription bearing such restriction, he should no more expect to use it again than to work a ticket 'good for one night only' for the whole season."

* * *

According to a paragraph in the *Canadian Pharmaceutical Journal* the proportion of chemists and druggists to the population in Toronto is very high; being, as calculated from the census returns, 1 to 1000, whilst taking the average of the whole of Canada the proportion is 1 to 2425. In Philadelphia the proportion of chemists and druggists to the general population is steadily increasing, there being now 600 drug stores to a population of 900,000, or 1 to 1500. The proportion of pharmacists to the population throughout the United States had risen in 1880 to 1 to 1810, from 1 to 2778 in 1850.

* * *

According to the *Pharmaceutische Centralhalle*, the Pharmacopœia Committee appointed by the German Pharmaceutical Association has agreed to recommend that paraldehyd, antipyrin, cannabinum tannicum and cocainum hydrochloricum shall be included in the next edition of the Pharmacopœa Germanica, and has drawn up characters and tests for them. It will be noticed that of these four articles one is the subject of a patent and two others are specialties of a particular manufacturer.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fourth general meeting of the Liverpool Chemists' Association was held at the Royal Institution, on Thursday evening, November 20. Mr. Edward Davies, President, in the chair.

The minutes of the last meeting were read and confirmed and several donations to the library were announced.

The President again called the attention of members to the forthcoming Annual Association Soirée of the various learned societies of the city on the 10th proximo, and said that any scientific novelties would be very acceptable for exhibition on that occasion.

Mr. A. C. Abraham exhibited a specimen of tannic acid prepared by alcohol in lieu of the B.P. ether process, which he believed was required for fining wines, etc.

The President was of opinion that tannic acid of the B.P. might be objected to for the purpose named on account of the smell of the ether, which remained in the B.P. preparation, and which could not be entirely got rid of.

Mr. Parkinson drew attention to the inconvenience of making up prescriptions in which anisecd oil was one of the ingredients, owing to the high congealing point of the latter, and said he would be glad of suggestions for obviating same.

Mr. A. C. Abraham, F.C.S., then read a note on—

The Analysis of Bark.

BY A. C. ABRAHAM, F.C.S.

I think I shall hardly be contradicted if I say that the first requirement in processes for the estimation of drugs, after accuracy of results, is facility of operation. It may even be doubted whether in some cases a less accurate method capable of being easily worked might not be better than a more accurate one which could not be carried out with the same facility.

My first statement, viz., that in the estimation of drugs facility of operation is only second to accuracy, is no doubt true of all analysis, but still not to the same extent as in the case of drugs, because general analysis is usually carried on by gentlemen who occupy their whole time with such work, but in the case of drugs they are or ought to be estimated by those who can give but a limited amount of attention to such work. It can hardly be doubted that the number of analyses by pharmacists of a drug is in direct proportion to the facility with which the process can be carried out. There are probably hundreds of pharmacists who would take the specific gravity of their ethers, acids, and so forth, who would not give the time necessary for an analysis of their opium or bark.

It is, therefore, of the greatest importance that every method should be devised to save labour and to render as far as possible technical analytical knowledge and experience unnecessary. It would probably be better that the Pharmacopœia should adopt the process, say for opium, which should give results within 1 per cent. if a simple one; rather than that an extremely accurate process, which but very few would carry out, should be sanctioncd.

The estimation of quinine in cinchona bark is probably doomed to be somewhat troublesome. The Pharmacopœia process, although, I believe, tacitly condemned, is the one by which we are at present bound to judge the quality of our material, so far at least as the Pharmacopœia standard is concerned.

As I do not myself profess to have any special knowledge respecting bark analysis I would not for one moment presume to say whether the process of De Vrij, for example, is or is not better than that of the Pharmacopœia, but simply taking the Pharmacopœia process as it stands would suggest certain slight modifications which seem to me to facilitate operations and avoid certain sources of error.

Let us consider the Pharmacopœia directions. In the first place to reduce the bark to very fine powder, if it is to be a fair sample, is not a very easy operation, because it will not do to take, say half a pound, of the bark and after sufficient beatings to sift out the fine until the required quantity is obtained. This method *may* give us a fair sample, but it is not right to assume that it does, for we know that in the case of some drugs it does not.

To obviate this difficulty I would propose to pass the quantity taken through a "40" sieve, through which the whole may be easily passed in a comparatively short time.

Such a powder as this is not, however, suitable for exhaustion by simply boiling and percolation, and I, therefore, substitute maceration in a water-bath, thus avoiding possible error due to too rapid percolation or inefficient packing, and saving the attention in any case necessary.

I think a decided saving in time and care would be effected if the approximate quantity of solution of subacetate of lead were stated. True, the quantity necessary cannot be well defined so long as the quantity of acid menstruum is not fixed, but this may easily be done if maceration alone is adopted.

The process which I venture to recommend as a modification of the details, not the principle, of the Pharmacopœia one is as follows:—

Take 200 grs. of the sample, place it in a tube, bottle or boiling test tube, with a glass stirring rod, add to it 2000 fl. grs. of distilled water, and note the weight accurately. Add 20 mm. acid. hydrochlor. Macerate four hours in a water-bath, with occasionally stirring; cool; make up to weight noted with distilled water. Macerate in the cold for at least twelve hours, stirring occasionally; filter. Take of the filtrate 1000 fl. grs. (=to 100 grs. of sample), add 60 mm. solution of subacetate of lead or sufficient to remove the colouring matter, but not to render the liquid alkaline; stir well; filter. Take of filtrate 500 fl. grs. (=to 50 grs. of sample), place it in a 3-oz. stoppered vial, add to it 50 mm. of a solution of caustic potash (1 in 4), or sufficient to nearly redissolve the precipitate first formed. Shake the liquid with two successive portions of 1 fl. oz. of absolute ether, and finally, with 1½ fl. ozs. of the same, allowing sufficient time in each case for the separation of the ethereal liquid, and drawing off as much as can be drawn off clear with a pipettc; allow the ethereal liquids to evaporate spontaneously in a tarcd capsule; dry at 212° F. and weigh. The residue multiplied by two gives the percentage of nearly pure quininc.

Thus modified the Pharmacopœia process does not involve one half the care and attention requisite for the process as it stands, although the timc occupied from the beginning to the end of the process is no doubt greater.

It is true that a minute error is admitted by making no allowance for the addition of the subacetate of lead solution, which may, however, be done if desired, but the error is so small that it is questionable whether it is worth while, especially when it is borne in mind that Pharmacopœia tests are only comparative.

Taking everything into consideration I believe this process is more accurate than the Pharmacopœia one, as it avoids several sources of error which, although perhaps they might not lead a professional analyst astray, may have this effect with a pharmacist.

I may perhaps, in conclusion, anticipate the objection that the process of the present Pharmacopœia is a bad one and will not be official for long. Be this as it may, my object is to point out the importance of simplifying as far as possible pharmacopœial estimations, so as to enable as many pharmacists as possible to use them and know the quality of thc drugs they employ, and I believe

that this modification which I have mentioned may be taken as a type of others which may also be simplified in a similar manner.

The principle which I have advocated before and do in this case is simply that by means of prolonged maceration, with or without heat, the whole active principle may be diffused through a known bulk of liquid, and that of this liquid a known bulk be taken without attempting to remove that portion which may remain with the liquid in the interstices of the solid matter treated.

One word with regard to the barks themselves. The East Indian red barks have been preferred by the best authorities as the most suitable for use in place of the fine calisaya, now unfortunately unobtainable. There is, however, one serious objection to their use, viz., their nauseons taste, which will, I believe, eventually lead to the disuse of their galenical preparations if adopted. Would it not be better to use double the proportion in the tinctures, etc., of some of those varieties which, although much poorer in quinine, are still more similar in character to the South American calisaya. From my own limited experience I should be inclined to say that there would not be much difficulty in obtaining barks of the same character as the old official calisaya, containing 2 per cent. of quinine, which, if used in double the proportion, would give results quite equal to those obtained from fine old calisaya bark.

The President said the method Mr. Abraham proposed was one that was largely employed by the German Association of Chemists, with the advantage of much saving of time, without loss of accuracy.

Mr. Conroy proposed a vote of thanks to Mr. Abraham and said that in the course of his experience he was often receiving complaints from druggists of the specific gravities of their purchased preparations being not as stated, which on examination were found to be the result of want of knowledge, on the druggist's part, in using their hydrometers, omission to take the temperatures, etc. He had adopted Mr. Abraham's method for a long time past in estimating opium, with saving of time and additional accuracy of results.

Dr. Symes seconded the vote of thanks, and Mr. Ward thoroughly supported the views already expressed. The motion, on being put, was carried unanimously, and Mr. A. C. Abraham replied.

Mr. M. Conroy, F.C.S., then read a note on—

Cream of Tartaraline.

BY MICHAEL CONROY, F.C.S.

Some months ago, at an evening meeting of the North British Branch of the Pharmaceutical Society, Mr. Peter MacEwan read a note on a substance which was being sold by grocers under the name of "Tartaraline," and which, owing to its low price was commanding a ready sale. Upon analysis, Mr. MacEwan found the substance to be simply acid sulphate of potash, a salt at one time official in the Dublin and Edinburgh Pharmacopœias.

The substance which I have the pleasure of bringing under your notice this evening is commercially known as "cream of tartaraline," and in appearance and on rough examination is more like cream of tartar than the article described by Mr. MacEwan. For instance, it chars upon heating and is more insoluble in water. On boiling a little in a test tube with water, the whole appeared to dissolve with formation of a starch-like mucilage which with iodine gave the well-known starch reaction. Under the microscope the starch was found to be potato farina. The remaining portion consisted of the acid sulphate of potash, $KHSO_4$. The starch, no doubt, is added with the view of reducing this powerful acid salt to a strength equal to that of cream of tartar, thus providing a substitute for the latter which bakers could use in the same proportion. I do not know to what extent this article is sold, but it is evident from the presence of starch that it is intended to be restricted to the use of bakers. It is a question, however, how far bakers are justified in using a substitute containing a powerful mineral acid instead of the mild tartaric acid of cream of tartar.

Mr. J. S. Ward proposed a vote of thanks to Mr. Conroy, which was seconded by Mr. A. C. Abraham who remarked, that it was an important matter to the public generally, as the sooner such preparations were exposed and the public knew what they were buying the better.

Mr. Edward Davies then read a note on "Lupine Seeds as Food for Cattle."

At the close of the paper, Mr. A. C. Abraham proposed and Mr. Parkinson seconded a vote of thanks to Mr. Davies for his interesting communication, which was supported by Mr. Dutton and Mr. Conroy, and carried unanimously.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The sixteenth annual meeting of this Association was held in the Memorial Hall, Albert Square, on Friday evening, November 21. Mr. Wilkinson, Vice-President, in the chair.

The annual report, which was read by Mr. Benger, Hon. Sec., stated that five ordinary meetings had been held during the session, papers having been read on the following subjects:—"The Examinations of the Pharmaceutical Society," by Mr. Elborne; "Disinfectants," by Mr. W. Kirkby; "Exotic Henbane," by Mr. Elborne; "Kamala," by Mr. W. Kirkby; "New Remedies," by Mr. F. C. J. Bird; "Coal: The Produets of its Distillation and the Manufacture of Coal Gas," by Messrs. A. W. Duncan and F. C. J. Bird.

A course of pharmaceutical education had been established at the Owens College, and amongst the beneficial results of this had been the formation of a Junior Pharmaceutical Association, under the title of the Manchester Pharmacy Students' Association. A good start had been made, about forty members had been enrolled, and many interesting papers had been read. A communication had recently been received from this body asking to be affiliated as a junior section of the Manchester Pharmaceutical Association, on condition that they conduct their own meetings and appoint their own officers. The matter had been duly considered by the Committee and the proposal agreed to.

Thanks were accorded to the authorities of the Owens College for their kindness in allowing the meetings to be held within their walls, to the Pharmaceutical Society for weekly copies of the *Pharmaceutical Journal*, and to the British Pharmaceutical Conference for the 'Year-Book of Pharmacy.'

The Treasurer, Mr. Woolley, presented his statement of accounts.

On the motion of the Chairman, seconded by Mr. Bird, the report and Treasurer's statement were adopted. The President and other officers were then re-elected.

Mr. Bird, the Honorary Secretary of the Junior Section, then read the following Report:—

Manchester Pharmacy Students' Association.

Report of the proceedings of the above Association from the date of its formation in March, 1884, to the present time:—

The Committee of the Association have chosen two courses by which to facilitate the mutual improvement and instruction of its members. Firstly, by the reading of papers and reports bearing on pharmacy at its monthly meetings, held in the Owens College (by kind permission of the Council), and, secondly, by visits on Saturday afternoons to manufactories, works, and other places having pharmaceutical interest in the vicinity of Manchester.

The following is a list of the papers read at the

meetings hitherto held:—"An Adulteration of Quince Seed," by Mr. W. Kirkby; "The Aconites," by Mr. W. Elborne; "The Poisons Question—Is legislation necessary? by Mr. A. D. Braze; "The Manufacture of Sulphuric Acid," by Mr. J. B. Thornley, and, on October 16, the inaugural address, entitled "With the Scientists in North America," was delivered by the President, Mr. Alfred H. Jackson, B.Sc.

These papers were contributed by members of the Association, and gave rise to very interesting discussions.

Through the kindness of gentlemen connected with the various works, etc., the Committee were enabled to arrange for the following visits, which were well attended and evidently much appreciated:—May 3, The Salford Corporation Gas-works, Regent Road; May 24, The Botanical Gardens, Old Trafford; June 21, Messrs. Tennant and Co's. Chemical and Sulphuric Acid Works, Ardwick Bridge, Ardwick.

The Committee have to report an encouraging attendance at the meetings. Out of thirty-eight members an average number of fourteen having been present.

They also wish to acknowledge their indebtedness to many members of the Council of the Manchester Pharmaceutical Association, also to several other pharmacists and friends for their kind assistance, and to express the hope that the future work of the Association may be carried on in such a manner as to merit the continuance of their approval.

The Chairman and other gentlemen congratulated the Junior Section on the vigorous beginning that had been made.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The second meeting of the session was held in the materia medica museum, Owens College, on Thursday evening, November 20. Mr. Alfred H. Jackson, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the following resolutions, which had been previously passed in committee, were submitted to the meeting by the President:—

"That a letter be sent to the Committee of the Manchester Pharmaceutical Association expressing the desire of the Manchester Pharmacy Students' Association to be recognized by the former as their Students' Section, the present title and mode of government of the latter, however, being retained."

"That in the event of a favourable reply being received from the Manchester Pharmaceutical Association, a report of the proceedings of the Manchester Pharmacy Students' Association be sent to the Secretary of the Manchester Pharmaceutical Association for incorporation with their annual report."

These resolutions were seconded by Mr. W. Elborne, and on being put to the vote were carried *nem. con.* The President, having reminded the members of the existence and conditions of the "Hart" prize, then called upon Mr. William Elborne, Vice-President, to read a Report upon Materia Medica, entitled—

Recent Substitutes for Quinine.

The assumption that quinine is a derivative of chinoline has led chemists to attempt to obtain by synthetical means other bodies possessing antipyretic properties to be used as substitutes for it. During the past two years, by processes of hydrogenation and oxidation of chinoline, Drs. Fischer, Königs and Knorr have succeeded in preparing an extensive series from this source, *e.g.*, kairin and antipyrin. Among the substances used as substitutes for quinine, belonging to the chinoline series, is chinoline itself, C_9H_7N, an oily liquid originally prepared by submitting cinchonine to destructive distillation with caustic potash. It was afterwards produced artificially by the action of caustic potash on aniline and glycerine, the tartrate of chinoline being considered the purest form for purposes of administration. A few months afterwards the compound known as kairin was introduced as a substitute for chinoline, and seemed likely to prove a formidable rival to quinine. Kairin is the name given to oxychinolinemethylhydride, the formula for which is $C_{10}H_{13}NO$.

In an editorial article which appeared at that time in the *British Medical Journal* the following opinion was expressed:—"It must be admitted that the prospects of kairin are anything but promising. It has been tried in this country, but as yet has found little favour. It will probably have its day, and then die out, as many remedies of the same class have already done." The views entertained in the above statement appear to have proved perfectly correct, for within the past few months a substance termed antipyrin has been introduced by the same investigators as being superior to both chinoline and kairin as a quinine substitute.

Antipyrin is a compound recently introduced into medicine by therapeutists as possessing the antipyretic properties of quinine and kairin, without producing the unpleasant effects of the latter. It was first prepared by Dr. Knorr in his laboratory at Erlangen, and is now being prepared upon a larger scale by Messrs. Meister, Lucius and Bruning, of Hoechst, and will probably soon come into general use in this country, the therapeutics of this substance having been most favourably reported upon by Filhehne, Penzolt, Busch, Van Noorden and Ernest, and summarized by Professor Leech in the *Medical Chronicle* (October, 1884). The following briefly refers to the mode of preparation and chemical composition of antipyrin:—

Phenylhydrazine, $C_6H_5NH.NH_2$, is obtained by dissolving 20 parts of aniline in 50 parts of HCl, sp. gr. 1·19, and 80 parts of water, and adding to the cold solution sodium nitrite dissolved in twice its weight of water acidulated with HCl. The quantity of nitrite required must be calculated from the following equation, the percentage of NO_2H in the salt being previously determined:—

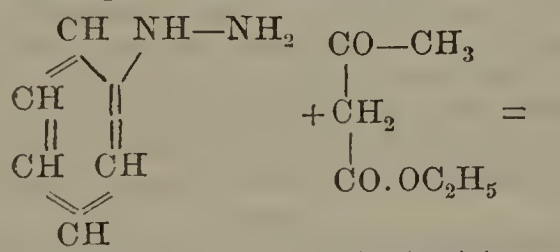
$$C_6H_5.NH_2 + NO_2H + HCl = C_6H_5N_2Cl + 2H_2O.$$

The solution thus obtained is poured into a solution of sodium sulphite, which must be in excess and cooled by ice.

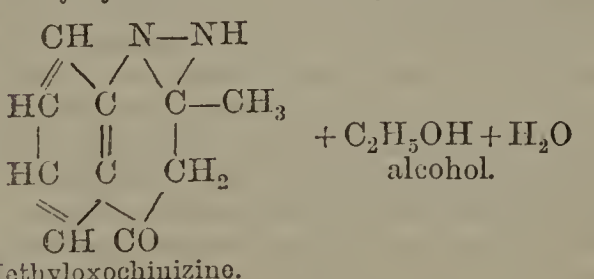
$$C_6H_5N_2Cl + H_2O + Na_2SO_3 = \overbrace{C_6H_5N_2H_2SO_3Na}^{A} + HNaSO_4.$$

The salt A is dissolved in boiling water and concentrated HCl added; on cooling phenylhydrazine hydrochloride, $C_6H_5.N_2H_3ClH$, crystallizes out and is decomposed by caustic soda.

On heating phenylhydrazine with ethylacetacetate to 100° the following reaction takes place:—

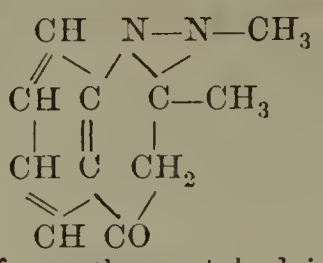


Phenylhydrazine. Ethylacetacetate.



Methyloxochinizine.

When methyloxychinizine is heated with methyl iodide and methyl alcohol it is converted into dimethyloxychinizin, now known as antipyrin.



It crystallizes from ether or toluol in glistening scales, melting at 113°. Its aqueous solution gives with ferric chloride a deep red coloration, even in a solution of 1 : 100,000.

Nitrous acid produces in a concentrated solution green crystals, in a dilute solution a bluish green colour. even in a dilution of 1 : 10,000. In commerce antipyrin occurs as a white powder, or in scales, very soluble in water; bitter, but much less so than quinine, and without the nauseous taste of kairin.

Antipyrin is reported to reduce the temperature in fevers of the gravest type from 2° to 3° without any disagreeable after-effects. The reduction of temperature takes place after one to two hours; the decline of temperature is effected without the profuse prespiration usually so common under similar circumstances, a gentle action of the skin only being produced. The period of action varies between seven and twenty hours.

Antipyrin is given in doses of 1 to 2 grams (15 to 30 grains).

After the reading of the report a discussion followed, in which the President and Mr. Kirkby took part.

Specimens of substances illustrative of the above paper were placed on the table by Mr. Elborne.

The proceedings then terminated, the date of the next meeting being announced for December 18.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

In accordance with a circular issued by the Council of the above Association inviting principals, their assistants and apprentices, a meeting was held on Friday evening, November 21, at the Grand Hotel, Colmore Row, Birmingham, which was numerously attended.

Apologies were received from several members who were either unavoidably absent or who had undertaken to do duty in order to permit of their employers being present.

The newly-elected President, Mr. Thomas Barclay, delivered a very interesting address with special reference to the objects of the m eting, viz., the organization of classes for the education of pharmaceutical students. He showed the great advantages to be derived by students directly and principals indirectly from an early scientific training, and obviating the system now known as cramming for an examination. Trade and other questions, such as the proposed legislation on the Poisons Bill, patent medicines, the curriculum, personal responsibility in the conduct of pharmacies, and the social status of the pharmacist, were each briefly alluded to, as well as some topics more of a local interest. In conclusion, Mr. Barclay congratulated the Association on the successful meeting.

Time being allowed for the discussion of the various subjects suggested by the address, Messrs. Wootton, G. E. Perry (Vice-President), A. Southall, S. Dewson, Alcock, and the Secretary, each having said a few words, a show of hands was taken in order to ascertain the number of students who wished to join classes, when it was found that there were about thirty who desired assistance and guidance in their studies for the Minor and Major examinations of the Pharmaceutical Scoiety.

The remainder of this highly successful meeting was devoted to the rendering of a selection of instrumental and vocal music by members and their friends. Light refreshments were provided by the Council during the evening.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

An open meeting of this Association was held in the house of the Pharmaceutical Society, 36, York Place, on the evening of Wednesday, November 19, at 9.15. The President, Mr. W. S. Turnbull, occupied the chair.

There was a full attendance of members and others.

The minutes of the former meeting were read and confirmed.

Samples of the ray liver oil, as introduced by Mr. Henry Hay, were exhibited by Mr. Peter Boa, who gave some interesting information regarding the manufacture and properties of this oil. He had made some experiments to emulsify the oil and had found yolk of egg the best agent to use, while gums as usually employed for cod liver oil were unsatisfactory, the ray liver oil being more difficult to emulsify.

A hearty vote of thanks was accorded to Mr. Boa for his practical contribution.

During an interval which followed, those present had an opportunity of examining a collection of unusual and spurious drugs, including Para rhatany, Ceylon gamboge in tears, Madras turmeric, Kola nuts, Maltese elaterium, the wood and leaves of *Salvador persica*, star anise, adulterated with the poisonous fruits of the allied *Illicium religiosum*, Copalchi bark (*Croton niveus*), specimens of spurious red and yellow cinchona barks, and of the three paraffins of the German Pharmacopœia. The fruit of *Luffa Ægyptica* was also on the table. Two exhibits created especial interest. These showed the circulation of the blood in the frog and of protoplasm in the vegetable cell.

After the interval, short descriptions of most of the exhibits were given by Messrs. Hill, MacEwan and Stephenson.

Votes of thanks were passed, both to the lenders of the various exhibits and to those gentlemen who had described them.

Some business matters were then gone into, after which the meeting broke up, the President having intimated that the next meeting would be held on Wednesday, 26th inst., when Mr. W. H. Duncan will read a paper entitled "Carnivorous Plants."

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, November 20, Dr. W. H. Perkin, F.R.S., President, in the chair.

During the evening a ballot was held, and the following gentlemen were declared by the Scrutators, Messrs. Davies and Greenaway, duly elected Fellows: — F. Broughton, F. J. Downs, L. Ehrmann, F. G. Holmes, J. Hulme, C. Thompson, W. F. Wyley.

The following certificates were read for the first time :—W. P. Ashe, J. Ballard, H. M. Chapman, J. D. Johnstone, G. F. Kendall, P. C. Porter, W. C. Wise.

Dr. Thorne then communicated the substance of a paper by KHAN BAHADUR BOMANJI SOBRABJI—

On some New Paraffins.—The reaction used by the author is the one proposed by Wurtz,

$$2C_nH_{2n+1}I + Na_2 = 2NaI + C_nH_{2n} + C_nH_{2n+2}.$$

The author gives an account of the preparation and properties of the following bodies:—Cetane, $C_{16}H_{34}$, boils at 278°, melts at 18° to 20°, its vapour density was found by Meyer's apparatus 7·9 to 7·85, theory requires 7·84. Dicetyl, $C_{32}H_{66}$, crystallizing in glistening scales which melt at 70°. Ethylcetyl and diheptyl, b. p. 245°.

Dr. Japp then read a paper—

On Additive and Condensation Compounds of Diketones with Ketones. By F. R. JAPP and N. H. J. MILLER — In a former communication it was shown that phenan-

thraquinone, acetone and ammonia react according to the equation,

$$C_{14}H_8O_2 + C_3H_6O + NH_3 = C_{17}H_{15}NO_2 + OH_2$$

and that the resulting compound, acetonephenanthraquinonimide, when treated with aqueous acids takes up water and parts with ammonia, yielding a compound of the formula $C_{17}H_{14}O_3$, which may be named acctonephenanthraquinone. A further study of this body has led the authors to abandon the formula which was at first given, and to believe that the constitution of this substance is—

$$\begin{array}{l} C_6H_4 - C(OH) - CH_2 - CO - CH_3 \\ \quad | \qquad\quad | \\ C_6H_4 - CO \end{array}$$

In the imide mentioned above the authors consider that the imido group attaches itself to the phenanthraquinone residue and not to the acetone residue, because when a mixture of phenanthraquinone and acetone is acted on by potash both carbonyl groups take part in the reaction, and an additive compound of one molecule of phenanthraquinone with two molecules of acetone is obtained (diacetonephenanthraquinone). Under other conditions an additive compound of two molecules of phenanthraquinone with one molecule of acetone was obtained. The authors also describe condensation compounds formed from the above additive compounds by the abstraction of the elements of water. They have extended the application of these reactions to the action of potash upon mixtures of benzil with acetone and with acetophenone respectively, and have obtained the compounds acetonebenzil and acetophenonebenzil. The substance obtained from acetonebenzil by the abstraction of water possesses considerable theoretical interest, since the hydroxyl group appears to be eliminated along with a hydrogen atom from the methyl group to form a closed-chain compound, whereas acetophenonebenzil parts with its hydroxyl group along with a hydrogen atom from the contiguous methylene group, yielding an unsaturated compound. The authors then describe in detail the action of potash of various strengths upon mixtures of phenanthraquinone and acetone; the action of acetic anhydride upon diacetonephenanthraquinone which gives rise to dehydrodiacetonephenanthraquinone, $C_{20}H_{18}O_3$; the action of nascent hydrogen upon acetonephenanthraquinone; the action of dilute potash upon monacetonephenanthraquinone; of strong potash upon a solution of acetonephenanthraquinone in acetone. The authors find that the action of diethylamine on acetonephenanthraquinone is identical with that of potash. The authors then give a detailed account of the action of potash upon mixtures of benzil and acetone, three distinct products may be obtained according to the conditions of the experiment. By acting with a small quantity of potash upon benzil dissolved in an excess of acetone, acetonebenzil is formed, $C_{17}H_{16}O_3$; if an excess of potash be employed a condensation product, dehydracetonebenzil, $C_{17}H_{14}O_2$, is obtained, by acting with a small quantity of potash upon acetone mixed with an excess of benzil a condensation product, dehydracetonedibenzil, $C_{31}H_{24}O_4$ is formed. These reactions are described in detail and also the action of heat, oxidizing agents, ammonia and hydroxylamine upon acetonebenzil, similar reactions with the two other products were studied. The action of potash in the cold upon a mixture of benzil and acetophenone was investigated. The products were dehydracetophenonebenzil, $C_{22}H_{16}O_2$, and acetophenonebenzil, $C_{22}H_{18}O_3$. By the action of bromine on the first of these two bodies a tetrabromide, $C_{22}H_{16}O_2Br_4$, was obtained.

Dr. Ramsay then read a paper—

On the Vapour Pressure of Acetic Acid and on a new method of determining the Vapour Pressures of Liquids. By W. Ramsay and Sydney Young.—The vapour pressures of acetic acid, which have given very discordant results in the hands of other observers, have been found to be perfectly concordant and regular by the authors. They use for the purpose of determining the vapour pressure of liquids, a species of still into which a thermometer dips; the bulb of the thermometer is covered with cotton wool or other suitable substance. Liquid can be admitted from time to time from a reservoir to moisten the cotton wool; heat is applied to the tube surrounding the thermometer and the liquid evaporates from the cotton wool without entering into ebullition. By altering the pressure in the apparatus the temperature registered by the thermometer correspondingly alters. By this means the determination of vapour pressures is easy and exact. The results obtained by this method have been shown, by exceedingly numerous observations, to be coincident with the vapour pressures measured in the ordinary way.

Dr. Masson then read a paper—

On the Action of the Halogens on the Salts of Trimethylsulphine. By L. Dorbin and Orme Masson.—When dry trimethylsulphine iodide was shaken up with an ethereal solution of iodine, a black tarry liquid was produced which did not crystallize; by the action of iodine on the bromide and chloride, reddish-black crystals were obtained which, however, were unstable in air and so were not analysed. By the action of the bromine vapour on the iodide a red oil was formed, which, after exposure for a short time to the air, solidified; the mass was washed with ether and crystallized from hot alcohol; orange-red crystals separated, which analysis proved to be trimethylsulphine dibromiodide, Me_3SIBr_2. Its properties and those of the platinum salt are given. The crystals are converted by ammonia solution into iodide of nitrogen. Ammonia gas, however, forms an addition product, $Me_3SIBr_2 2NH_3$, an amorphous, non-explosive, light-green solid, stable only in an atmosphere of ammonia. Chlorine forms with trimethylsulphine iodide a substance crystallizing from hot alcohol in canary yellow crystals, Me_3SICl_2; the platinum and silver salts were prepared with ammonia; it behaves like the dibromiodide mentioned above. Iodinemonochloride also forms with the chloride, trimethylsulphine dichloriodide. Iodine monochloriodide forms with the bromide the substance $Me_3SIBrCl$. Similar bodies are formed by the action of bromine on the bromide, bromine on the chloride, chlorine on the bromide, chlorine on the chloride. The authors have also partly investigated the action of the halogens on trimethylsulphine sulphate. From their results they conclude that all the haloid salts of trimethylsulphine combine directly with halogen chlorine, bromine, iodine and iodinemonochloride. In no case is one replaced by the other. The product of each reaction may be formulated as Me_3SX_3 (X = Cl; Br or I). The constitution of these bodies the authors consider to be $Me_3S{<}^{X}_{X}{>}X$ in which the sulphur is hexad. In conclusion the authors point out the analogy of these bodies to the polyiodides and bromides of the nitrogen bases. They purpose making a complete investigation of the halogen compounds of the tetramethylammonium salts, which has been commenced.

In answer to Dr. Armstrong, Dr. Masson did not think that the bodies were molecular compounds, $Me_3Sx(X_2)$, because of the comparatively high temperature, 180°, neeessary to effect their decomposition.

Dr. Japp said that sulphur was already known to combine with six monads in the body SI_6 and that Lothar Meyer had also suggested the possible heptadic character of nitrogen.

Mr. S. U. Pickering then read a—

Note on the Heats of Dissolution of the Sulphates of Potassium and Lithium.—This paper is similar to the paper on sodium sulphate read at the last meeting, but the potassium and lithium salts do not seem to form isomeric modifications.

Dr. Armstrong said that when potassium displaced the hydrogen in sulphuric acid more energy seemed to be lost than when the hydrogen was replaced by sodium

and it was interesting to find the sodium salt forming combinations which did not exist in the potassium salt.

Dr. Hodgkinson in confirmation of Dr. Armstrong's remarks stated that zinc dissolved in sodium sulphate, but was unacted upon by the potash salt.

On the Application of Iron Sulphate in Agriculture and its Value as a Plant Food. By A. B. GRIFFITHS.—This paper contains an account of further researches on this subject (*Chem. Soc. Trans.*, 1884., 71). The author has grown duplicate crops of beans, turnips and wheat under similar conditions, excepting one set was manured with ½ cwt. of ferrous sulphate per acre, the other having no iron salt added. With the beans, the crop with the iron yielded 44 bushels of grain; without the iron, only 28 bushels were produced; the plants and pods in the first case (with iron) contained more iron and phosphoric acid than in the second (without iron). No difference as regards these constituents was found in the seeds. In the case of wheat no very marked increase in the weight of the crop was observed, but the wheat grown with the iron seemed to be healthier and completely resisted "rust" which attacked the crop grown without iron. With the turnips the plot manured with ferrous sulphate gave 16½ tons, the unmanured 13 tons of roots; the former contained markedly more iron and phosphoric acid. From some estimations of chlorophyll made by Dr. Russell it appears that the use of sulphate of iron increases the amount of chlorophyll in the leaves. An excess of sulphate acts as a poison.

Notes on the Chemical Alterations in Green Fodder during its Conversion into Ensilage. By C. RICHARDSON, United States Department of Agriculture.—Professor Kinch and Dr. Kellner have already published some observations which prove that during the conversion of grass, etc., into ensilage a considerable increase in the quantity of non-albuminoid nitrogen takes place. The author of the present paper has confirmed this result in the case of maize. Thus in a sample of original maize, the percentage of the total nitrogen which existed in the non-albumenoid condition amounted to 21·2, in ordinary dried fodder 15·6, in ensilage 44·6, to 49·6, in ensilage from young maize 53·3, from older maize 47·1, so that in silos a large portion of the albuminoids is converted into non-albuminoid nitrogenous substance, while in the ordinary drying of fodder no such change takes place. This loss, according to the author, is due to the comparatively large amount of ammonia combined with the acids produced during the fermentation and which is lost in drying the specimens for analysis. Thus from 4000 parts by weight of ensilage he obtained 8·66 of ammonium chloride =2·266 of nitrogen. The remaining non-albuminoid nitrogen is probably present as an amide. Ensilage contains about 2 per cent. of acids, of which 0·6 is lactic, the rest acetic acid. The author gives many analyses of maize and ensilage which exhibit great variations in composition and show how unsafe it is to generalize from one experiment.

On the Decomposition of Silver Fulminate by Hydrochloric Acid. By E. DIVERS and MICHITADA KAWAKITA.—In a previous note the authors stated that silver fulminate differed from the mercury salt in yielding much less than the full amount of hydroxyammonium chloride and in yielding ammonium chloride. The present communication contains the results of a further examination of the action of hydrochloric acid upon silver fulminate, and in addition an investigation of the action of dilute hydrochloric acid upon mercury fulminate, and of the action of the acid upon fulminurates in relation to the production of hydroxyammonium chloride, formic acid and ammonia, and of Steiner's production of oxalic acid from mercury fulminate. The silver fulminate was found to contain 71·79 per cent. and 71·76 per cent. of Ag. Unlike the mercury salt silver fulminate is fiercely attacked by concentrated hydrochloric acid; it shrivels up and decomposes with a loud hissing noise into very hot products. The authors have carried out this reaction without accident. If the heating be not checked the silver chloride is at first orange, but rapidly loses this colour, imparting it to the acid mother liquor. An unstable colourless substance is formed, giving an intense wine red colour with ferric chloride in acid as well as neutral solutions. This substance is completely decomposed by heating. In all cases a small quantity of hydrocyanic acid was formed. The hissing noise of the decomposition is attended with the escape of carbon dioxide. The yield of hydroxyammonium chloride depends for its amount on the strength of the hydrochloric acid used. With strong acid in large excess, the temperature being allowed to rise, only 21·55 per cent. was obtained; out of the full yield 46·33 per cent.; with dilute acid 43·52 per cent. was formed. Formic acid seems to be produced in about the same ratio as the hydroxyammonium chloride. The yellow colouring matter mentioned above seems to be produced at the expense of that portion of the fulminate which would otherwise become hydroxylamine and formic acid. The quantity of ammonium chloride formed varies inversely as the quantity of hydroxyammonium chloride; if the hydrochloric acid be dilute no ammonium chloride is produced, so that with dilute hydrochloric acid the action on silver fulminate does not differ from that on the mercury salt. The authors could not form any hydroxyammonium chloride or formic acid by the action of hydrochloric acid on potassium or silver fulminurate. They have also repeated Steiner's reaction, *i.e.*, decomposing mercury fulminate by hydrogen sulphide in ether, but could not detect a trace of oxalic acid. The paper concludes with a brief discussion on the constitution of the fulminates by Dr. Divers.

The Society then adjourned to December 4, when the following papers will be read:—"Calorimetric Determinations of Magnesium Sulphate," by S. U. Pickering; "Fluorenes," by Dr. Hodgkinson.

SOCIETY OF ARTS.

At a meeting of the Society of Arts, held on Wednesday, in the rooms of the Society, the Duke of Buckingham and Chandos presiding, a paper was read by Mr. Ernest Hart on "The International Health Exhibition, its Influence and Possible Sequels."

Mr. Ernest Hart, after describing some of the principal features of the exhibition relating to the general health of the body and mind, spoke more particularly of the Hygienic laboratory conducted by Professor Corfield, and of the Biological laboratory under the direction of Mr. Watson Cheyne, the worthy pupil of Sir Joseph Lister, who acted as chairman of the Laboratory Sub-Committee. Here were shown by practical working and by collections such as had never before been seen in this conntry with the same compleness, the refined methods of research and of teaching by which we are enabled to study the life, history, and the habits, the development and the means of arresting the development of those minute organisms which modern science has shown to be prime factors in the causation of a great proportion of the most fatal diseases which afflict our flocks and herds, which decimate mankind, and which attack those plants and animals which constitute the staple of our food supplies. Mr. Cheyne's demonstrations were eagerly followed by health students from all parts of the kingdom. A certain number of tables were set apart for study and research, and these were fully occupied from the first to the last day that the exhibition was open. In Dr. Corfield's laboratory was collected the apparatus for that kind of instruction in the chemical and physical examination of soil, air, water, food, clothing, and materials of house construction which are essential elements in the education of that great army of medical officers of health who are appointed now under existing Acts of Parliament to watch over the health interest of the community. It was very well known, however, that a large majority of those gentle-

men had not this necessary instruction, and that at the present moment there did not exist in this country any adequate means for giving such instruction. There were in England one thousand one hundred and two medical officers of health, and nine hundred and ninety-six inspectors of nuisances, all of whom were expected to get their information, and to acquire the technical knowledge of which they stood daily in need, as best they could; and it was well known that a large proportion of them were very imperfectly equipped, indeed, with the necessary knowledge, and, indeed, could hardly be said to possess even the rudiments of systematic technical education in subjects in which they were presumed to be experts, on which they were called upon to decide in matters largely effecting the pockets of the community, and intimately concerning its health. Illustrating the importance of such laboratories, Mr. Hart referred to exhibits in the French Court of apparatus, etc., used by M. Pasteur, and gave some details of the saving to commercial and agricultural interests of the researches of that discoverer as exemplified in the economies effected in the manufacture of wine, and beer, and in the arrest of charbon and silk-worm disease. That which he looked forward to as the best possible sequel to this exhibition was the establishment of these laboratories, so vastly important to the prevention of disease and the maintenance of our population in health, and of the library, on a permanent footing and under suitable direction. The rumour that such a project was about to be submitted to his Royal Highness, the President of the Exhibition, with whom would rest the ultimate decision as to the disposal of any parts of the surplus, had awakened the liveliest interest and satisfaction among the authorities of the leading sanitary associations in this country, and he was glad to know that the authorities of the Parkes Museum, of the Sanitary Institute, of the Social Science Association, of the Society of Medical Officers of Health, and of the National Health Society had each, on their own individual motion, taken the opportunity of expressing, by resolutions and memorials, their strong sense of the great national value which they considered would attach to the accomplishment of this design. Should this proposition prove acceptable to the authorities there was no doubt that the opinion of the great body of persons interested in the sanitary progress of this country, thus early expressed by the official representatives of every form of sanitary progress, would declare itself strongly in favour of an institution from which considerable results might be anticipated in the furtherance of health education, and of our knowledge of all that relates to the prevention of disease. It was further hoped that an institute of public health founded on this basis might prove a home and centre with which these numerous voluntary organizations now working for the public health might connect themselves by some well co-ordinated and accepted plan; that it might be a centre where their members would be able to meet; where libraries, class-rooms and meeting-rooms might be made to serve a valuable purpose in bringing these various societies into closer relation. There was reason to hope that many of the great scientific associations which now fostered the progress of science by grants to individual workers would heartily welcome the establishment in this country of what it so greatly needed—a place of higher education and research in sanitary science, such as had been recently created in France and Germany. The practical demonstration which this exhibition afforded of the eagerness of the English people to resort to healthful means of outdoor amusement was in itself a valuable result and an important experience. It was no small thing to have acquired the conviction that our open spaces might be, and should be, much more largely devoted to the open-air recreation of the people than they were at present. Why should they not learn from the success of the music and the lighting of the gardens of the Health Exhibition that our great parks should all be lighted by the electric light at night, and that throughout the spring and summer months the military bands should play there, and should make those places, which were now not only useless but scandals to the metropolis, the sites of healthful and innocent recreation. He had been assured on good authority that the cost of adequately lighting Hyde Park by the electric light, so that it might add to the resources of health and enjoyment for the teeming population surrounding it, would involve an annual expenditure of £5000. They would all greatly rejoice if it should prove that the efficient lighting of the parks, and the introduction of music to enliven and attract the people, and to add to their innocent recreation, the health and the happiness of our working population should form also one of the possible sequels of this exhibition.

The Duke of Buckingham and Chandos, in moving a vote of thanks to Mr. Hart for his paper, expressed his sense of the good which might be expected to follow from the establishment of such public health laboratories as had been suggested.

Review.

The National Dispensatory. By Alfred Stillé, M.D., LL.D. and John M. Maisch, Ph.D. Third edition.*

The ready sale of the first edition of this work and the publication of a second edition in the same year, 1879, is sufficient evidence of the high estimation in which this important and most exhaustive treatise is deservedly held. Since the second edition was issued, three new editions of pharmacopœias have been published, viz., those of the United States, Germany and France, and although the latter did not appear until the present edition of the 'National Dispensatory' was ready for the press, the authors have managed to incorporate in their work all that was new or of special importance in the French Codex.

With a laudable desire to make the 'Dispensatory' a thoroughly trustworthy and standard work of reference, not only upon the materia medica of the Pharmacopœia of the United States, to which it has special regard, but also of those of Great Britain, France and Germany, the authors have carried on a long series of investigations for the purpose of verifying the statements, processes, tests, etc., in the new pharmacopœias, and have added the necessary corrections in the proper places. It thus becomes a valuable commentary on four national pharmacopœias.

It has also been made to include as many as possible of the daily increasing number of new remedies which are continuously being brought under the notice of the medical profession. To sift out those that are unworthy of notice and to give the due proportion of space to each drug that has proved of any medicinal value must have required the exercise of considerable judgment and tact. The process of selection has, however, been managed most successfully, those remedies which seem to be growing in importance receiving a special notice, while those less generally accepted by the medical profession are briefly noticed as "Allied Drugs" under more important drugs possessing similar properties. It will be found, therefore, by the practical pharmacist who wishes to keep pace with the times, to be a most valuable work of reference, to which, when he cannot spare the time to look through the back numbers of pharmaceutical or medical journals, he may turn with the hope of finding a condensed account of all that is known up to the date of publication concerning any of the remedies that have lately come into use.

Those who take a real interest in the subject of materia medica will appreciate the numerous historical notes that have been added in this edition, and will

* London: J. and A. Churchill. 1884. Imp. 8vo. Pp. i.-xv., 1-1755. 36s.

welcome the fuller descriptions and the more numerous microscopical illustrations that are now given.

Some idea of the additions that have been made to the present edition of the 'National Dispensatory' may be gathered from the fact that there are 3700 more references in the general index than in the second edition, and that the number of woodcuts has been increased by about eighty, exclusive of those that have been replaced by new and more satisfactory ones.

The therapeutical notes have also been considerably extended, occupying altogether a space equal to about eighty pages of the second edition, while the index of therapeutics contains nearly 1600 new references.

The busy practitioner who requires a suggestive list of all the remedies that may be tried in any disease with some prospect of success will find the therapeutical index exceedingly useful, as well as the condensed and thoroughly practical notes given in the body of the work, more especially since references are now given to the best articles on the therapeutical uses of each drug. This important feature suggests that the same method might be advantageously extended in a future edition to the paragraphs devoted to the chemical constituents, under which heading only the dates of the various investigations there referred to are now given. Although the *précis* of the chemistry of each drug is admirably complete and exhaustive, yet without references to the original papers the reader is left in some doubt how to reconcile the apparently contradictory statements of different investigators, and whether or no some of the active principles mentioned are identical with, or are formed by the splitting up of other bodies.

In a very few instances a slip of the pen may be noticed; thus, on p. 115 rotoine and scopoleine are described as having been found in Japanese aconite by Langgaard. When the immense amount of work involved in working through four pharmacopœias and condensing and bringing up to date the widely scattered information published on materia medica and therapeutics in the journals of all civilized nations is taken into consideration, and the short time that has elapsed since the new edition of the United States Pharmacopœia was issued, the wonder is that so extremely few errors should be found in it. We can confidently recommend the work as one of the most valuable standard works of reference to the pharmacist ever published.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Benevolent Fund.

Sir,—By a few words in your report of the meeting of the Council in the Journal of the 8th inst., it will be seen that I have recently written a letter to the Council in reference to the present position of the Benevolent Fund, and as the facts contained in my letter show a state of things by no means satisfactory or creditable to the trade at large, I venture to recur to the subject in your pages, hoping that by so doing attention may be drawn to it, and that as a practical result the Secretary may shortly be able to report a considerable number of new subscribers as well as increased subscriptions from others at present contributing but small amounts.

At the outset we are met by a statement on the authority of the Secretary in a circular, which in itself ought to lead every thoughtful member of the trade to ask himself, "What is my duty as regards this Fund, which at the present time is carrying permanent relief to over forty aged and necessitous members of the trade, and giving temporary relief to a far greater number as occasion requires, regardless of membership with the Society or not?" The statement to which I refer is to the following effect:—That out of 13,000 names upon the official Register, close upon 11,000 persons are withholding any contribution whatever to a Fund upon which any one of them have a legitimate claim should misfortune overtake them, and to which experience proves they at once have recourse. Surely but a moment's reflection would be required, could this fact be brought home to these 11,000 members of the trade, to carry conviction to their consciences that at least half-a-crown a year (*i.e.*, the smallest subscription received, and less than three farthings a week) might be spared without any serious sacrifice, whereas this small subscription would at once increase the Fund by no less a sum than £1375, and how many could afford larger amounts it is not for me to say.

But further, having made a somewhat careful analysis of the amounts contributed at the present time by some of the largest and wealthiest towns in the Kingdom (exclusive of London) the want of interest is evidenced to an almost incredible degree. Thus I find a town with over two hundred and fifty chemists sending about £20, another with over one hundred chemists sending under £4, another with over seventy chemists forwarding about £3 10*s.*, another with forty chemists contributing under £2, others with from twenty to thirty chemists giving less than £1, while more than one town is satisfied with a single 2*s.* 6*d.*

Again, if we turn to the yearly Financial Report of the Fund during the past eight years corroborative evidence of its unsatisfactory state is seen in the fact that between 1876 and 1881 the total receipts by annual subscriptions had increased by only £21. In 1882 a special effort was made by the Council, by which an increase of nearly £400 was added to the amount, but the decrease apparent last year clearly shows that for sustaining a steady increase something more than spasmodic action is needed.

The question most naturally arises, In what way can the interest of the trade be stimulated and the contributions permanently increased? That the local secretaries can be expected to sacrifice the amount of time needed annually to canvass and collect in large towns is, I fear, too great a demand upon them, added to which a large number of towns have no local secretary. Would it be well to employ in such towns paid collectors, known to and under the supervision of the local secretaries, where such are appointed, and elsewhere under a local chemist duly appointed by their neighbours or the Society? Could a more direct and systematic mode of making known the claims of the Fund be made through the post from the Society, at least once a year, to every chemist on the Register, as is so frequently done by other similar funds? Would the monthly publication of subscriptions as received, in our own Journal and the *Chemist and Druggist* journal, tend to keep the subject in the forefront? All these and doubtless many other plans naturally occur to one's mind, and the hope that their discussion in your columns may elicit a widerspread interest among the members of the trade generally resulting in a considerable increase of subscriptions will, I trust, justify the admission of these lines.

Edwin B. Vizer.

Inquirer.—We would advise you to address your question to a competent medical authority. So far as we are able to judge such a proceeding would be improper.

A Warning.—"A Chemist" desires to warn our readers against the operations of a swindler who goes from town to town pretending to start soda water works, and after getting all the goods he can on credit tells his creditors the business belongs to his wife and that he has no effects.

G. James.—Although some decomposition might have taken place, it is not quite clear what caused the sickness, which may indeed have been due to idiosyncrasy.

Major.—See a Report of a Committee appointed by the National Health Society upon a test for arsenic in domestic fabrics, in the *Pharmaceutical Journal* for July 7, 1883, p. 5.

T. Stokoe.—Vapor Pini Sylvestris (Throat Hosp.).—"Oil of Scotch Pine" (fir wool oil), 2 fl. drachms; light carbonate of magnesia, 60 grs.; water to 3 fl. ounces. Mix. A teaspoonful in a pint of water at 150° F. at each inhalation.

J. Simpson is recommended to examine his bismuth salt and see if he can find in it any explanation of the evolution of carbonic acid to which the accident was probably due.

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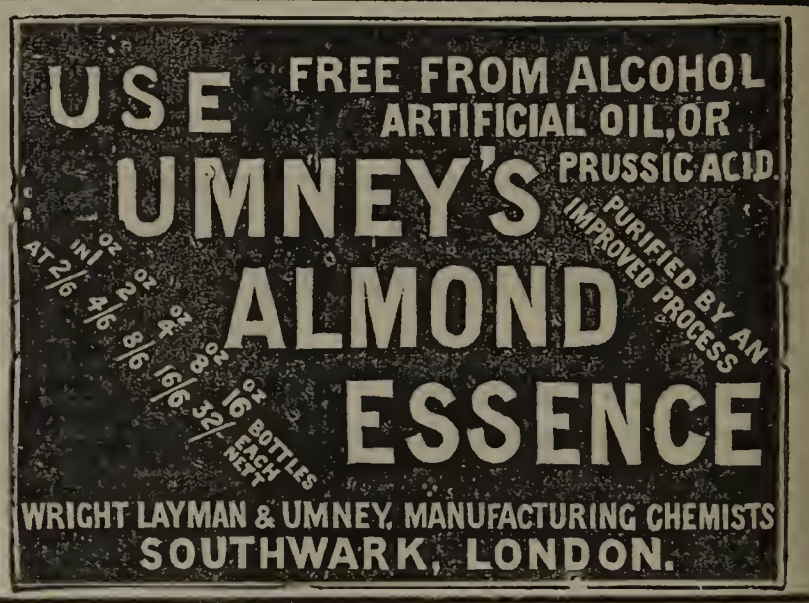

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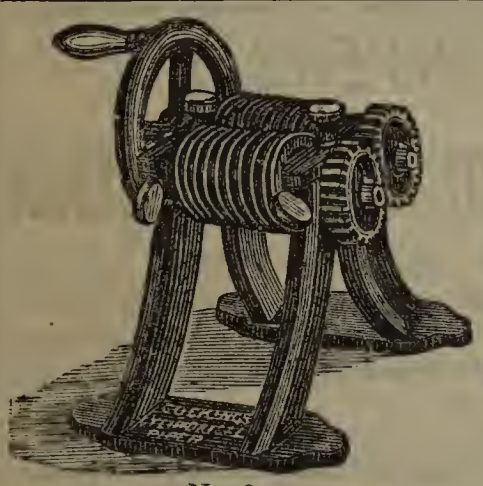

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MANAGING Assistant. From 23 to 30 years of age. Must be single and have passed Minor. In-door. Comfortable home. Suburban. State salary, &c., to A. B., Messrs. T. Hodgkinsons, Prestons and King, 81, Bishopsgate St. Without, E.C.

A COMPETENT Assistant. Not under 23 years of age. In-doors. Must have good references. One desiring a permanency preferred. Apply personally, if possible, to W. Bower, Pharmaceutical Chemist, 96, Tottenham Court Rd., London, W.

BY December 14th.—A competent Assistant. One possessing Minor qualification preferred. Please state salary required, &c., to Perks & Llewellyn, Hitchin.

TO Students.—A Pharmaceutical Chemist offers board and lodging with assistance in preparing for examination in return for a few hours help daily. Address, Pharmacist, 3, Dungannon Ter., North End Rd., S.W.

IMMEDIATELY.—A Junior Assistant, well up in Dispensing. Quick and active. References must be good, send carte. Apply, C. W. Botwood, Pharmacist, High St., Poole, Dorset.

MANAGER for light Retail, Prescribing and Dispensing business. About 30 years of age, and able to Extract Teeth. Single. Abstainer, and one seeking permanency preferred. Must have undeniable references. Salary about £50. In-doors. Apply in full, stating age height, references, qualification, experience, when disengaged, enclosing carte, to Griffin, Chemist, Monument Rd., Birmingham. Also vacancy for an Apprentice.

AN Improver.—Apply, T. H., 314, High St., Lincoln.

IMMEDIATELY.—A competent Assistant. Must be a good Dispenser, accustomed to a country trade, and understand the Welsh language. An eligible and permanent situation for a suitable person. Apply, stating particulars, to J. Harrison Jones, Chemist, Denbigh.

BY middle of December, a good Junior. Must be a quick and reliable Dispenser, of gentlemanly address and of good principles and character. Business select light Retail and Dispensing. Apply to F. R. Bessant, Westgate-on-Sea.

AN active Junior, in-doors, for a good country business. Must be steady, willing and obliging, able to Dispense. Apply, with full particulars and references, to G. W. Shackleton, Chemist, Abergavenny, Monmouthshire.

J. C. POTTAGE, Homœopathic Chemist, 117, Princes St., Edinburgh, is in want of an active Junior Assistant (out-door). A knowledge of Homœopathy not essential. State salary and references.

A GOOD Junior, capable of taking part charge of a Branch. Light Retail and Prescribing business. State full particulars, with photo., if possible, to F. H. Fresson, 61, New Rd., Southampton. A vacancy for an Apprentice.

A FIRST-CLASS Assistant, to take charge of the Dispensing department, &c. One who has had London experience preferred. No Prescribing. Apply, personally between 9 a.m. and 7 p.m., to W. C. Jones (private entrance), 2, Queen's Rd., Lancaster Gate, W.

BUSINESSES FOR DISPOSAL.

CASH £500.—Near London, East. A sound Retail Business. Established 13 years and improving yearly. A great opening for a good Prescriber and Dispenser of Prescriptions. Clear profit £200 yearly. For particulars, Messrs. Burgess, Willows & Francis, 101, High Holborn, London.

SOUTH.—A genuine and profitable light Retail, Dispensing and Prescribing Business. Modern fittings. Well stocked. Corner shop. Main street. Returns £400; increasing. Good opportunity for beginner. Rent low. Can be let off. Owner taking larger business. For particulars, address F. W., care of Messrs. Edwards & Son, Queen Victoria St., London.

CLAPHAM.—Prescribing and Retail. Returns £8 weekly, at full prices. Profits good. Chiefly Prescribing. If prices were cut and retail pushed, receipts might be doubled. Price £300. Stock and fixtures worth £200. 9-roomed house and garden. Long lease at £60. Immediate sale compulsory as money is wanted. H. P., Mr. Wright, Newsagent, 6, Northcote Rd., Battersea, S.W.

MESSRS. GURDEN BERDOE have for transfer:—London, S.W. Rare opportunity of securing very profitable Retail and Dispensing trade. Owner retiring. Returns £1100. For £600, and balance by arrangement. S.E. Unopposed Retail and Prescribing trade. Returning by manager £8 week. For £175. S.W. Elegantly fitted Retail. Fittings worth £155. For £160. Owner ill. Kensington. Good class Dispensing trade. Making £300 net profit. For £650. N.W. Corner Retail. Returns £400. Neglected. For £200. Wilts. Unopposed Retail. Returning £350. Rent and taxes £15. For £200. Norfolk. Unopposed Retail and Prescribing trade. Returns £500. Large house and garden. For £375. East Coast. Unopposed Retail and Dispensing trade. Returns £800. Also the freehold house (rental value £40). Together £1300. Bristol (near). Retail and Dispensing trade. Returns £600. For £400. Net profit £250. South Coast (not Brighton). Retail and Dispensing trade. Showing £400 net profit. For £750. Apply, 30, Jewry St., Aldgate, City.

A MIXED Drug Business, situated in a market town in the Midland Counties, of 37 years standing, by the present owner. Sole cause of disposal defective eyesight. Valuation, &c., £600 to £700. Further particulars, apply, C. M., care of Barron, Harveys & Co., 6, Giltspur St., London.

SOUTH Wales.—An old established genuine Drug Business, with immediate possession. Through death. Fair receipts. Shop well fitted (mahogany). Good house and garden. A rare opportunity for anyone wanting a business in a good agricultural district. For further particulars apply to W. E., Victoria Pl., Crickhowell.

IN Northern suburb. Returning £700, at full prices. Good house. Shop well fitted and stocked. Only £400; part cash. A great bargain. S. A handsomely fitted, fairly stocked, but much neglected business. Only £140 as it stands. Suit beginner. Surrey. Elegantly fitted and increasing trade of £1200 per annum. Very profitable. Price £1100. South Coast. Returning £1000, and rapidly increasing. Price £950. W.C. Returning £8 weekly. Much neglected. Price £150 only. Stafford. Returns £450. Newly fitted. First reasonable offer taken. Glo'ster. Returning £800. Price about £600. Notts. Returns £1500. Price only £1000. Oxfordshire. Returns £800. Full prices. Going very cheaply. Hants. Returns £1000. £500 cash would purchase. Rare bargain to anyone. West End. Returning £900, and rapidly increasing. Good class trade. Cash £500. Apply to Hine Gilbert & Co., 17, Hart St., Bloomsbury Sq.

BUSINESSES FOR DISPOSAL.

£3000 returns. Good class Family Retail and Dispensing, in best position of important town. To be sold through exceptional circumstances at a low price. Pharmacy, Messrs. Burgoynes & Co., 16, Coleman St., E.C.

WANTED TO PURCHASE.

IMMEDIATELY, or after Christmas.—Retail, Dispensing and Prescribing Business, in respectable neighbourhood, in or near London. Returning from £600 to £1000. Must have comfortable house, with good lease. Or a bonus of £5 would be given for introduction to approved opening. Chemist, Messrs. Hodgkinsons, Stead & Treacher, Upper Whitecross St.

E. NATALI, Shop Fitter, 207, Old Street, E.C., begs to inform Chemists, &c., that he is prepared to Fit Shops in town or country at very reduced rates, on the deferred payment principle.

FOR SALE.

Glass Counter Cases, bent plate-glass, 2ft. long, 30s.; 2ft. 6in. long, 35s.; 3ft. long, 60s.; 3ft. 6in. long, 70s.; 4ft. long, 75s.; 5ft. long, A 18, £5; 6ft. long, A 18, £6; 8ft. long, £8; 3ft. long, A 4, 80s.; Tooth Brush Cases, bent plate, A 10, to open at back, 30s.; ditto, revolving front, 55s.; A 9, 30s.; plate-glass Cases, A 2, 3ft., 35s.; 3ft. 6in., 40s.; 4ft., 50s.; 5ft., 60s.

Wall Cases, 12ft. long, £6 10s.; 10ft. long, 9ft. high, £20; 8ft. long, 9ft. high, A 88, £27; 11ft. long, £7; 10ft. Wall Case, with nest 20 mahogany drawers under, £10.

Fixtures, Drawers, Shelving, with cornice over, A 84, 6ft. long, £6; 8ft. long, £8; 10ft. long, £10; 12ft. long, £12; also as A 82, 12ft. long, with cupboards, drawers, shelving, &c., £9.

Counters, painted fronts, mahogany tops, 5ft., 6ft., 8ft., 10ft., 12ft., 14ft.; ditto, with polished oak fronts, 7ft., 10ft., 14ft.; Counters, with mahogany polished fronts, 9ft. long, 12ft. long, 18ft. long; Counters, with mahogany and plate-glass cases in front, 4ft., 6ft., 9ft., 12ft., 14ft.

Dispensing Screens, 5ft., 6ft., 7ft. 6in., as fig. A 55; 3ft., 3ft. 6in., 4ft., as A 54; Dispensing Screens, any size, glass case at each side, silvered plate-glass centre, with marble slab in front, very elaborate, £7.

Desks, with cases in front, 40s., 50s., 60s., with silvered glass back, inside case, 65s.

Sponge Cases, A 41, 60s.; A 43, 95s.; Show Stands, A 37, 55s.; as fig. 5, 50s.; fig. 6, 60s.

Specie Jars, with gold covers, 27in. high, royal arms, &c., 80s. pair; a quantity of blue and white Ointment Jars, labelled, 18s. doz.; Mortars (new), Funnels (new), Pill Machines (new), to cut 24, 16s.; Black Stock Bottles (new), labelled any names, 15s. doz.; 4 10-gall. Carboys, with stands, 21s. each; Reversible Pill Machine, 3 and 5 gr., marble slab, 25s.; Royal Arms, splendid condition, for outside shop, 45s.

E. Natali, 207, Old Street, near Pitfield Street, London.

FOR SALE CHEAP.

GOOD opportunity for Chemist. The new and never used Stock and Fixtures of a Surgeon's Dispensary, in a fast developing neighbourhood. It is one of a row of business shops, and could be easily converted into a Chemist's shop. Apply to Mr. Green, 63, Sutherland Gardens, Maida Vale.

STOCK & FIXTURES FOR SALE CHEAP.

COMPRISING Bottles, Drawers, Cabinet, Carboys, Counters, Glass Case, implements in trade, together with a Stock of Drugs. Good opening for young beginner, there being no opposition for miles. Particulars of Arthur Wood, Ullesthorpe, Lutterworth.

GLOUCESTERSHIRE.

APPOINTMENT OF COUNTY ANALYST.

[Sale of Food and Drugs Act, 38 and 39 Vic., c. 63.]

NOTICE is hereby given that at the ensuing EPIPHANY QUARTER SESSIONS, to be holden at the Shirehall, Gloucester, on the 6th day of January, 1885, the Court will proceed to the ELECTION of an ANALYST of all Articles of Food and Drugs sold within the county of Gloucester, to be appointed under the provisions of the said Act.

It will be required of Persons offering themselves as Candidates for the Office that they shall possess competent knowledge, skill, and experience as such Analyst, and the Person selected will be required to reside within the county, or within the city of Bristol. In the performance of the duties of his office he will analyse and report without charge, and give evidence if required, on all articles sent to him by the Police under the said Act. A Salary or annual sum of £100, and £15 allowance for Chemicals, will be paid him. A Room at the Police Station at Cheltenham is provided as a Laboratory. He will be further required to analyse all articles or things unprovided for by statute which shall be sent to him, on a scale of charges to be submitted by him to the Court of Quarter Sessions, and to be approved by such Court.

Applications, with testimonials annexed, are to be sent to the Clerk of the Peace for this county before the 13th day of December next.

FRANCIS EDWARD GUISE,
Clerk of the Peace.

Shirehall, Gloucester, 21st November, 1884.

A YOUNG German Chemist wishes to meet with an English Chemist to give lessons in German in exchange for English. M. W., 17, Archer St., Notting Hill.

INSTRUCTION IN PILL COATING

GIVEN BY

N. ALLSWORTH, Pharmaceutical Chemist,

147, CITY ROAD, E.C.

ONE Lesson of half-hour sufficient to enable any one to Coat Pills of a pearly lustre, white and uniform, equal to any of the wholesale makers.

No special apparatus required.

Terms, including recipe, 10s. 6d.

Samples and particulars forwarded on receipt of stamped envelope.

Traveller. To Wholesale Chemists, Druggists' Sundrymen, Oil and Colourmen, or Drysalters.

A GENTLEMAN having a large connection amongst Chemists, &c., and covering the West of England, Midlands, South East and Eastern Counties, will be open at the beginning of the year to represent a first-class firm. A. Y. Z., Buckley's Hotel, 15a, Finsbury Sq., London, E.C.

TO BE SOLD.

ONE of Mondollot's "Acme" Soda Water Machines. Cylinder silver lined. Produces 300 dozen per day. The machine is in excellent condition, and the waters made by it are of a very superior quality. For price and full particulars apply to J. Anthony Basker, Pharmaceutical Chemist, Bridgwater.

TO BE LET.

MIDDLESEX (West).—A commanding corner Shop and Premises. Good opening for Chemist and Druggist. Rent £40. Lease 7, 14 or 21 years. Premium for lease and fixtures £100, or the present business of a Fancy Repository could be carried on. Stock at valuation, optional. Freehold could be purchased. Further particulars and orders to view of Mr. Samuel Goddard, Estate and Business Agent, 217, High St., Brentford Middlesex.

Midland Counties' Transfer Agency.

F. J. BRETT,

Trade Valuer and Auctioneer,

LEICESTER.

VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Purchasers have, at this agency, the advantage of about 300 Businesses to select from, requiring from £100 to £3000 capital.

Probate and Fire Insurance valuations.

LONDON, N.W.—Dispensing and good class RETAIL, returning £550, well fitted shop, good house, low rent, price £400.

MIDLANDS.—Country RETAIL, short hours, returns £1500, net profit £300, price £900.

WARWICKSHIRE.—Exceptionally profitable RETAIL, returns over £500, and capable of considerable increase, age and ill-health necessitate sale, price £500, or as arranged.

WORCESTERSHIRE.—Village RETAIL, with Dispensing and good Prescribing, returns £500, rent £20, price £320.

LIVERPOOL.—Family Trade and DISPENSING, in excellent position, returns average £800, an excellent chance, price £500.

HOMŒOPATHIC.—LEICESTER. Death vacancy, net profit £100, only one other homœopathic chemist to 150,000, a smart business man would treble returns, price £120, rent free to Christmas.

YORKSHIRE.—£1700 returns, general RETAIL, with Wines and Spirits and Ale agency, situated in a picturesque village, at valuation, £900.

NOTTINGHAM.—Family Retail and DISPENSING, recently opened, doing £4 week and will sure to double soon, satisfactory reason for sale; also general RETAIL, returns about £500, for £250.

LONDON, W.—Dispensing and light RETAIL, doing £6 week, and increasing, for £200.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

VIZER'S

CHEMISTS' TRANSFER and ASSISTANTS' REGISTRATION AGENCY,

Victoria Chambers, 55, Chancery Lane, London.

Gentlemen desiring to dispose of businesses without undue publicity may depend on special precautions to that end. Early particulars should be sent.

Purchasers applying for businesses should specify locality preferred and capital to be invested.

ASSISTANTS' REGISTRATION DEPARTMENT.

An Employer writes: "*Mr. ——— wishes to thank you for your prompt attention to his application.*"

An Assistant writes: "*The situation seems to be quite suitable to me, and I feel much indebted to you.*"

Employers and Assistants should send full particulars of requirements, with Registration Fee, 2/6, *Postal Order.*

WANTED in each large town in the United Kingdom the leading Chemist to undertake sole agency for sale of the universally celebrated

BOND STREET CIGARETTES.

Applications to be made to PHILIP MORRIS & Co., 22, New Bond St., London, W.

CHEMISTS' TRANSFERS.

32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business, will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

MESSRS. ORRIDGE & CO. are instructed to transfer :—

1. LONDON, S.W.—Close to Piccadilly. Small select nucleus of BUSINESS for disposal, suitable for a branch. The investment of about £300 required. Full particulars on application. Position and fixtures good. Valuation or lump sum, at purchaser's option.

2. LONDON, N.E.—Main road. Retail and DISPENSING. Splendid position. Neighbourhood rapidly improving. Returns nearly £600. Large house and good garden. Price £450. Open to an offer. Vendor wishing to succeed his father in a larger business is open to arrange moderate terms.

3. SURREY.—Half an hour's journey from Waterloo. In a very attractive and healthy locality. Good class Retail and DISPENSING. Returns over £700. Opposition nominal. Large, double-fronted shop; very attractive. Good house; low rent. Price about £650. Worth attention.

4. SOUTHERN COUNTY.—Beautiful climate. Good class Dispensing and RETAIL. Returns nearly £750; increasing. Full prices. Attractive shop, with large house. Large garden, well stocked with fruit trees, &c. Price about £700.

Either of the following businesses (well known to Messrs. O. & Co.) may be purchased by valuation :—

5. Six miles from LONDON BRIDGE.—Returns £600.
6. IPSWICH.—Returns £500.
7. HANTS. „ £925.
8. MIDLANDS. „ £1500.
9. EASTERN COUNTIES.—Returns £1200.
10. CATHEDRAL TOWN. „ nearly £2000.
11. GLOUCESTERSHIRE. „ £550.
12. WESTERN COUNTY. „ £750.

Other businesses, town and country. Particulars free on application.

VALUATIONS.

Terms for valuation on application.

Appointments for December should be made early.

ORRIDGE & CO.

32, Ludgate Hill, E.C.

CONDY'S FLUID—IMITATIONS

APOLOGY AND INJUNCTION.

In the High Court of Justice (CHANCERY DIVISION.)

CONDY & MITCHELL, Limited, *Plaintiffs*

67, Turnmill Street, London, E.C.

v.

ROBERT SUMNER & CO. *Defendants,*

WHOLESALE DRUGGISTS, 40a, Lord Street, Liverpool.

We, the undersigned Defendants in this case, having, in ignorance of the legal rights of the Plaintiffs, sold disinfecting fluid under the name of **"CONDY'S FLUID,"** such compound NOT being of the Plaintiffs' manufacture, hereby express our regret, and have consented to a PERPETUAL INJUNCTION WITH COSTS in this action.

Dated 17th day of October, 1884.

(*Signed*) R. SUMNER & CO.

(Witness) J. W. THOMPSON, Solicitor, Liverpool.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 754.] SATURDAY, DECEMBER 6, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

Page

Liquid Extract of Cinchona. By Professor Redwood 441
The Manufacture of Sugar of Milk in Switzerland. By J. Kunz..... 443
The Employment of Lupine Seeds as Cattle Food. By E. Davies, F.I.C... 446
New Methods for Detecting Chlorates in Solution. By M. Fourmont..... 446

EDITORIAL ARTICLES AND NOTES :—

The Alterability of Chloroform 447
Notes:—The Benevolent Fund—Evening Meeting in Edinburgh—The Medical Profession and Dispensing—Chinese Opium Sellers in Victoria—Duodecimals *v.* Decimals—Thymol as an Adulterant of Menthol 448

Page

TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY :—

Meeting of the Council :—
Reports of Committees 450
Grants from the Benevolent Fund 450
The Proposed New Bye-Laws .. 451

Evening Meeting 453

General Meeting.—Benevolent Fund :—
Election of Annuitants 456

PROVINCIAL TRANSACTIONS :—

Chemists and Druggists' Trade Association of Great Britain 456

Page

The Registered Chemists' Trade Association of Liverpool 457

PROCEEDINGS OF SCIENTIFIC SOCIETIES :—

Edinburgh University Chemical Society 457
School of Pharmacy Students' Association 58
Chemists' Assistants' Association .. 58

OBITUARY :—

Hermann Kolbe..... 459

CORRESPONDENCE :—

Serpents' Eggs 460
Answers to Correspondents 460

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *forty-five* annuitants, receiving £1510 per annum, and casual relief is also granted, amounting to between £500 and £600 per annum, involving a total annual expenditure of upwards of £2000.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of
Half-a-crown are entitled at each election of Annuitants to .. .. ONE Vote.
Five Shillings .. .. TWO Votes.
Half-a-guinea .. .. FIVE Votes
One Guinea.. .. .. TEN Votes.

And to increase in the same proportion.

Five Guineas are entitled to .. .. FIVE Votes for life.
Ten Guineas .. .. TEN Votes for life.

And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations and Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to RICHARD BREMRIDGE.

READING COVERS FOR JOURNAL.

COVERS with strings to hold 26 numbers of the Journal may be obtained of the Publishers, Messrs. CHURCHILL, 11, New Burlington Street, W., price 2s. each.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the second **Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself :—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

NORTH BRITISH BRANCH.

36, YORK PLACE, EDINBURGH.

EVENING MEETING.

A meeting will be held in the Society's house in Edinburgh, on Wednesday evening, December 10th, at half-past Eight o'clock.

Mr. JOHN NESBIT in the Chair.

Order of proceedings :—

1. Introductory remarks by the Chairman.
2. Communication on "The Estimation of Spirit of Nitrous Ether." By D. B. DOTT, F.R.S.E.
3. Note on "The Estimation of the Oxides of Mercury." By M. DECHAN and T. MABEN.

The Donations to the Library and Museum will be placed on the table.

INDEX TO ADVERTISEMENTS.

		Page
ALLEN & HANBURYS	Jujubes	11
ALLSWORTH, N.	Instructions in Pill Coating	27
APOLLINARIS CO. (Ld.)	Hunyadi Janos	17
ASSISTANTS WANTED		24, 25
BAILLIERE, TINDAL & COX	Works for Chemists and Students	
BARNETT & FOSTER	Health Exhibition Awards	9
BARRON, SQUIRE & CO.	Wholesale and Export Druggists	12
BOLE HALL MILL CO.	Surgical Bandage	16
BOWERBANK, E., & SONS	Spirit of Wine, &c.	19
BREHMER, A.	Folding Cardboard Boxes	20
BRETT, F. J.	Transfer Agency	27
BULLOCK, J. L., & CO.	Pepsine	
BURROUGHS, WELLCOME & CO.	New Improvements in Pharmacy	5
BUSINESSES FOR DISPOSAL		25, 26
CENTRAL SCHOOL of CHEMISTRY and PHARMACY		22
CHEMISTS' BALL		3
CHRISTY, T., & CO.	Menthol Cones	19
CHUBB & CO.	Seidlitz Powders, &c.	10
CLARKE	Blood Mixture	21
CONYNGHAM & CO.	Homœopathic Absorbent Wafers	20
COWAN, W.	Vaccination Shields	10
DARLING, W.	Dr. Coffin's Dentifrice	16
DAVENPORT & CO.	Soda Water Machinery	8
DAWES, A.	Tutor	22
DINNEFORD & CO.	Fluid Magnesia	21
ENGAGEMENTS WANTED		23, 24
EVANS, LESCHER & WEBB.	Savar's Cigarettes	16
EVANS, SONS & CO.	Savaresse's Capsules	16
EWEN, J., & SONS	Lard, Marrow, and Suet	21
FIELD, J. C. & J.	Samphire Soap	15
FINK, F., & CO.	Glycerine, &c.	16
FITCH & NOTTINGHAM	Leeches	6
FOR SALE		26
FRY, J. S., & SONS	Malted Cocoa, &c.	17
GLOUCESTERSHIRE (APPOINTMENT OF COUNTY ANALYST)		26
GOULD, E., & SON	Homœopathic Medicines	20
GRINDLEY & CO.	Petroleum Jelly	16
HARRIS, H., & CO.	Bottles	21
HEARN, RIDDELL & CO.	Bottles	10
HILL, G.	Dr. Barr Meadows' "Eruptions"	4
HOGE'S HONEY CO. (Ld.)	Horehound Honey	18
HOOPER & CO.	Brighton Seltzer	8
HUBBUCK, T., & SON	Pure Oxide of Zinc	17
HUGHES, W.	Magic Lanterns	17
INGRAM & ROYLE	Friedrichshall Water	10
JUDD, H.	Classes	22
KAY BROTHERS	Coaguline, &c.	18
KEMP, W., & SON	Crushed Linseed, &c.	20
KIDDLE, J. L.	James's Fever Powder	16
KILNER BROS.	Bottles	20
LORIMER & CO.	Drugs, Chemicals, &c.	13
MANCHESTER COLLEGE OF CHEMISTRY AND PHARMACY		23
MAW, SON & THOMPSON	Earthenware Inhalers	28
MAW, SON & THOMPSON	Feeding Bottles	7
MORRIS, P., & CO.	Bond Street Cigarettes	26
MOTTERSHEAD & CO.	Benger's Preparations of Digestive Ferments	19
MUMFORD, G. S.	Crushed Linseed, &c., &c.	6
MURRAY, SIR JAS.	Fluid Magnesia	19
ORRIDGE & CO.	Transfer Agency	27
PHARMACEUTICAL SOCIETY OF GREAT BRITAIN	Official Notices	1
POWELL, T.	Balsam of Aniseed	20
PRICE'S PATENT CANDLE CO.	Glycerine	18
ROBBINS, J., & CO.	Methylene and Ether	21
ROBINSON, G. H.	500 Practical Trade Receipts	3
ROBINSON & SONS	Lint	12
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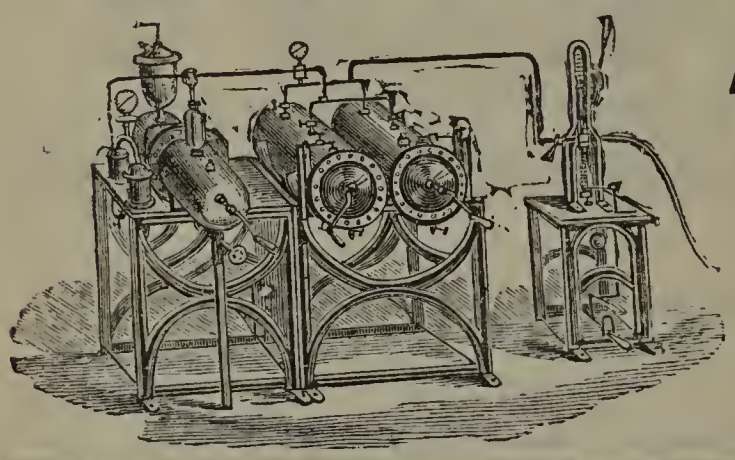

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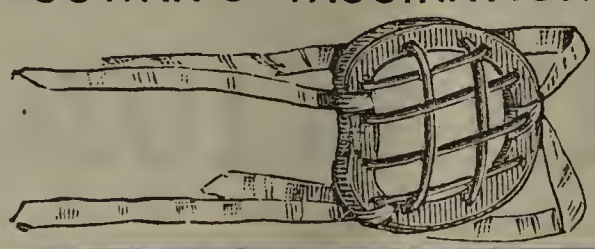

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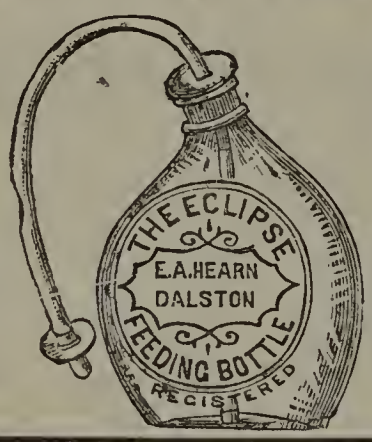

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LIQUID EXTRACT OF CINCHONA.*

BY PROFESSOR REDWOOD.

Some months ago, on the 2nd of last April, I read a paper on "Aqueous Extraction of Cinchona Bark," in which I suggested an improved method of preparing "Liquid Extract of Cinchona."

The investigation I had then undertaken, some of the early results of which formed the basis of the communication made on that occasion, had for its object the discovery of a process by which cinchona bark could be practically exhausted of its valuable medicinal constituents by an aqueous menstruum, and a liquid extract produced which should have the alkaloidal, astringent, and aromatic properties of the bark. I courted the free criticism of pharmacists on the details of the process which I had then but imperfectly elaborated, and some useful suggestions and critical remarks were made at the reading of the paper and subsequently, from which I have endeavoured to profit in the further investigation of the subject to which I am about to refer.

The Bark.—In these experiments I have exclusively used red cinchona bark, good samples of which may be readily obtained, especially among the barks taken from cultivated trees. Those on which I have mostly worked have been quilled succirubra barks, containing from 5 to 6 per cent. of total alkaloids. Most of the samples of flat red bark I have met with have been South American, and have been deficient in alkaloids, but unduly rich in quinovin and cinchona red, two of the constituents of cinchona barks that are least credited with any useful properties. I would suggest that for this and other similar purposes in pharmacy quilled red bark only should be used, and that it should contain from 5 to 6 per cent. of total alkaloids, of which at least one-half should consist of quinine and cinchonidine. If this proposition were acceded to it would be the duty of wholesale dealers to select bark of the specified description, while it would be the duty of those who might have occasion to use it in the production of pharmaceutical preparations to satisfy themselves that what was supplied to them corresponded in characters and properties with that which was officially required. A good, tolerably rapid and sufficiently accurate method of estimating not only the total alkaloids, but also the two special alkaloids which are considered the most efficacious, would therefore be an important desideratum, and I have taken some pains in endeavouring to find such a method,—one that would pretty easily yield reliable results to others than professed bark analysts. I am indebted to Mr. C. H. Wood, who has had long and extensive experience in the analysis of barks, for the suggestion of a method which he has been accustomed to use, and which I have found to realize what is required in a very satisfactory manner. It is as follows:—

Mix 200 grains of red bark, in No. 60 powder, with 60 grains of hydrate of lime; slightly moisten the powders with half an ounce of water and a fluid drachm of solution of ammonia; mix the whole intimately in a small porcelain dish or wedgewood mortar; allow the mixture to stand for an hour or two, when it will present the characters of a moist, dark brown powder, in which there should be no lumps or visible white particles. Transfer this powder to a six-ounce flask, add 3 fluid ounces of a mixture of 4 volumes of commercial benzol and 1 volume of amylic alcohol, boil them together for about half-an-hour, decant and drain off the liquid on to a filter leaving the powder in the flask, add more of the benzol liquid to the powder and boil again, then turn the contents of the flask on to the filter and wash by percolation with more of the liquid. If during the boiling a funnel be placed in the mouth of the flask and another flask filled with cold water be placed in the funnel this will form a convenient condenser which will prevent the loss of more than a small quantity of the boiling liquid. Introduce the collected filtrate while still warm into a stoppered glass separator, add to it 20 minims of diluted hydrochloric acid, B.P., mixed with 2 fluid drachms of water, shake them well together, and when the acid liquid has separated, carrying with it the alkaloids in solution as hydrochlorates, this may be drawn off, and the process repeated with 2 fluid drachms of distilled water slightly acidulated with hydrochloric acid. The acid liquid thus obtained will have very little colour; it will contain the whole of the alkaloids with excess of hydrochloric acid. It is to be carefully and exactly neutralized with ammonia, and then concentrated to the bulk of 3 fluid drachms.

If now 15 grains of Rochelle salt dissolved in twice its weight of water be added to the neutral hydrochlorates, and the mixture stirred with a glass rod, the insoluble tartrates of quinine and cinchonidine will separate, completely in about a hour, and these collected on a filter, washed and dried, will be almost perfectly white and pure, and will contain eight-tenths of their weight of the alkaloids quinine and cinchonidine.

The other alkaloids will be left in the mother-liquor, from which they may be precipitated with ammonia, then collected, washed, dried and weighed.

We thus have the whole of the required results obtained in one process. The quinine and cinchonidine calculated from the tartrates and divided by two gives the percentage of those constituents of the bark, and the weight of the other alkaloids divided by two and added to the former gives the weight of the total alkaloids.

The Menstruum.—The primary object being to extract the alkaloids contained in the bark, together with kinic and cinchotannic acids, by means of an aqueous solvent, seeing that water alone fails to accomplish this object, the addition of a mineral or other acid naturally suggests itself. I have used by preference hydrochloric acid, partly on account of its solvent action on the alkaloids and certain of their insoluble salts, partly on account of its volatility in the free state, and partly on account of its being the acid present in the stomach and therefore necessarily brought into contact with whatever is put into the stomach. The bark may be completely exhausted of its alkaloids by acting upon it in a very finely divided state with aqueous solution of hydrochloric acid, aided by the application of heat. But for the purpose here contemplated it is necessary to limit as far as possible the quantity of acid used as well as the amount of heat applied. In the disc ussion that followed the reading of my previous paper I was reminded that other experimenters had failed to extract the whole of the alkaloids present in bark by treating it as I had done with dilute hydrochloric acid, and I have been anxious to satisfy myself on

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, Wednesday, December 3, 1884.

this point, as I had, I confess too hastily, concluded that sufficient acid being used, and the bark submitted to its action in a finely, although not very finely, divided state, solution of the alkaloids would result.

I am now convinced that in this respect I was mistaken. In fact, I have been surprised to find that operating on bark, reduced to No. 60 powder, with much more acid than was required to dissolve the alkaloids if fairly brought into contact with them, the acid liquid might be made to percolate through the bark for a considerable time without further apparent effect after it had ceased to give evidence of the presence of alkaloids in the percolate; and yet the same residual bark would readily yield alkaloids, in small quantity, to the lime and alcohol process. It would seem as if hydrochloric acid failed to penetrate or percolate through the small masses of a No. 60 powder of this bark to a sufficient extent to ensure complete exhaustion; or possibly part of the alkaloids may be retained in combination with quinovin, or quinovic acid, or cinchona red, and such combination may not be easily broken up by dilute hydrochloric acid. At any rate, while most of the alkaloids are extracted a small quantity remains behind.

The Extraction.—I commenced my experiments by using half a fluid ounce of hydrochloric acid, with water, for the exhaustion of a pound of bark. On finding that the exhaustion was not complete I tried the effect of a larger quantity of acid, but the result was no better, or so little better that the value of the increased product was more than counterbalanced by the ill effects arising from excess of acid. I also tried the effect of percolating as well as macerating the bark with dilute hydrochloric acid, but still without obtaining the result looked for.

I therefore adhere to my original method of operating, which, as the result of numerous experiments, I find, with careful manipulation, yields 90 per cent. of the alkaloids from barks containing from 5 to 6 per cent, of total alkaloids; and I consider this sufficiently satisfactory to justify the adoption of the process as one suitable for the proposed purpose.

The Concentration.—I have suggested evaporation at a water-bath heat rather than at a lower temperature, with the view of shortening the duration of exposure to heat and air, having found in similar cases that less injury results from a slight increase of temperature with a considerable shortening of exposure, than from a change in the opposite direction. Of course by a water-bath heat I mean what the Pharmacopœia represents as such, that is a temperature below the boiling point of water, and it may be from 10 to 20 or more degrees below 212° F., according to the nature of the evaporating vessel used. In this process the vessel containing the evaporating liquid should be composed either of porcelain or enamelled iron, and in such case I have found that the temperature of the evaporating liquid rarely rises above 180°, to which I should limit the evaporating heat, thus assimilating it to that at which the maceration is conducted. The rate of evaporation at this temperature will be nearly double that at 160°, at which in the present Pharmacopœia the liquid extract is directed to be evaporated.

I find it advantageous in conducting the process to carry the concentration at once to the production of a solid, but not a dry, extract, and subsequently to treat this with water for the purpose of separating the insoluble matter, in making the liquid extract. The solid extract so produced would be available for use as such, and also for the preparation of simple tincture of bark, as well as for the liquid extract, for the production of which it has been mainly designed. If made with selected and previously tested bark, such as I have referred to, it will be about one-third the weight of the bark used in its production, and it will contain about 15 per cent. of its weight of total alkaloids. I do not propose that it should be standardized otherwise than by the use, in its production, of bark of known alkaloidal strength. When produced the percentage of total alkaloids contained in it should be determined and marked on the vessel containing it. The estimation may be easily made as follows:—

Dissolve 20 grains of the extract in 2 fluid drachms of distilled water, aiding the solution with a little heat. Transfer this to a stoppered glass separator capable of holding 3 or 4 ounces of liquid. Add 1 fluid ounce of solution of soda and 1 fluid ounce of ether. Shake them well and thoroughly together, and allow them to stand until the colourless ethereal solution of the alkaloids has separated from the dark brown alkaline solution of the other constituents of the extract; then run off the latter by the stop-cock and decant the former into a small porcelain or glass dish, the weight of which is known.

Allow the ether to evaporate, at first spontaneously or merely aided by blowing over the surface, or by floating the dish on luke-warm water, but at the end of the evaporation the heat of a water-bath may be used to remove the last trace of moisture. The weight of the dish and its contents after deducting the known weight of the dish will give that of the alkaloids, and this multiplied by 5 will give the percentage of total alkaloids in the extract.

This method would hardly be available excepting where the bark used in producing the extract has been selected and previously analysed. The analysis having excluded any bark with excess of cinchonine, the method may be adopted.

The Liquid Extract.—My original proposition was that liquid extract of cinchona should contain a specified quantity (5 per cent.) of the mixed alkaloids, together with the astringent and aromatic principles of the bark, and that it should admit of dilution with water without becoming turbid. The method by which I proposed to attain these objects was to extract the alkaloids together with the kinic and cinchotannic acids by a process differing only from that I have just described for obtaining the solid extract, inasmuch as I formerly removed from the concentrated product the matter which precipitates on dilution with water before completing the concentration to the state of solid extract, while I now propose to do it afterwards. I have aimed throughout at retaining in the finished product as much as possible of the cinchotannic acid of the bark, but in the process of evaporation, and even by exposure to the air afterwards, some of the cinchotannic acid becomes converted into inert cinchona red, which will precipitate on dilution. I have found that liquid extract of cinchona made by my previously published process will, after a time, when much diluted, throw down a precipitate. I have endeavoured to find a remedy for this, and believe that the most suitable and efficient remedy consists in the use of glycerine, which seems to prevent oxidation or other change in the cinchotannic acid. The

glycerine may be made to replace the spirit otherwise used for the preservation of the liquid extract, but I prefer to retain the spirit and merely to replace part of the water by glycerine. I am not aware of any valid objection that could be urged against the use of glycerine for this purpose, but I shall be glad to hear what may be said with reference to it, not only by pharmacists, but especially by medical men.

The entire process as I now conduct it is as follows:—

Take of—

Red cinchona bark, in No. 60 powder	1 pound.
Hydrochloric acid	½ fl. ounce.
Distilled water	a sufficiency.

Mix the acid with 4 pints of the water, add this to the bark, macerate at 180° for four hours, stirring the ingredients constantly, and replacing any water that may evaporate; then transfer to a percolator, and when the liquid has ceased to drop and the bark has been well packed, carefully place distilled water over the surface of the bark and continue to percolate slowly until 12 pints of liquid have passed, or it is found that what is passing has ceased to give a precipitate on the addition to it of an excess of solution of soda.

Evaporate the percolated liquid, in a porcelain or enamelled iron vessel, at a temperature not exceeding 180°, until on cooling it forms a firm extract.

If a bark free from excess of quinovin and cinchona red has been employed in the process, the extract may at once have its alkaloidal strength determined, and it will then be ready for use in making the liquid extract. But if on dissolving 30 grains of the solid extract in 2 drachms of distilled water with heat it gives more than a slight precipitate on cooling, the whole of the extract should be similarly treated, and the clear liquid either removed from the precipitate by decantation or separated by filtration, and afterwards again evaporated to the consistence of a solid extract, the alkaloidal strength of which is to be determined in the manner already indicated.

Liquid Extract of Cinchona.

Take of—

Extract of cinchona, as much as contains of total alkaloids	1 ounce.
Glycerine, Rectified spirit, of each	5 fl. ounces.
Distilled water	a sufficiency.

Put the extract, the glycerine and 5 ounces of water into a porcelain dish, and heat them over a water-bath until solution is effected; then allow the mixture to cool, and add the spirit and as much more water as is required to make the product measure one pint.

[*The discussion on this paper is printed at p.* 453.]

THE MANUFACTURE OF SUGAR OF MILK IN SWITZERLAND.*

BY J. KUNZ.

1. *The Chemistry and Commerce of Milk-Sugar.*

Sugar of milk is a regular constituent of the milk of all mammals. Horse's and ass's milk usually contains 6 per cent. and over, cow's, goat's, and sheep's milk between 4 and 5 per cent., and sow's milk 3 per cent. Woman's milk contains less albuminoids and fat than cows' milk, but a larger proportion of sugar of milk: on an average 6 per cent.

* From the *American Druggist*, September.

Owing to its comparatively difficult solubility and its great readiness to crystallize, sugar of milk may easily be obtained in a pure condition, and, indeed, as it appears in the market it is one of those commercial chemicals that most nearly approach purity.

If sugar of milk is crystallized by *cooling* its aqueous solution, and afterwards dried, the crystals contain 5 per cent., or 1 molecule, of water: $C_{12}H_{22}O_{11}.H_2O$. On the other hand, if it crystallizes during *evaporation*, the crystals are anhydrous: $C_{12}H_{22}O_{11}$, a circumstance which has formerly often been overlooked in calculating the results of milk analyses.

When long kept in dry, warm rooms, crystallized sugar of milk loses any moisture mechanically inclosed by the crystals. For this reason, old stock is always perferred to new. Unseasoned milk-sugar is apt to become sticky during powdering, and as it easily becomes warm during this operation, often turns into a caoutchouc-like mass. On the other hand, if the milk-sugar has been properly dried, no such disagreeable results will occur.

One of the first steps in the manufacture of milk-sugar is the removal of albuminoids and fat. The more complete the separation of the latter, the more easy will be the crystallization of the sugar. On this account, we find the manufacture of milk-sugar almost exclusively combined with that of "Swiss" cheese, particularly in the Alps, where the uniform method of feeding, the low temperature of the air, and the fact that the milk is usually worked up for cheese at its place of production. combine in facilitating an almost complete separation of the various constituents of the milk.

Though comparatively insignificant, alongside of the production of cheese and butter, yet the manufacture of milk-sugar has gradually grown up and become almost localized in the cantons of Berne and Luzerne. According to the statements of some manufacturers residing in the district, sugar of milk has been produced there, as a commercial article, during the past four hundred years.

The first customer was Italy, which even to-day consumes considerable quantities for medicinal purposes —for instance, in the preparation of a popular laxative made from sugar of milk and lemon-juice.

At the present day, England and the United States are the chief consumers of milk-sugar, it being largely used in those countries in homœopathic as well as in allopathic practice, and also reported as being frequently employed as an addition to milk for feeding babies.* Upon the Continent of Europe, cane-sugar is usually employed, instead of milk-sugar, on account of its being cheaper than the latter, the advantages of which, in other respects, are of course well recognized.

For technical purposes, milk-sugar never acquired much importance. It has been employed in the preparation of lactic acid, in silvering, and to a slight extent for making caramel.

Its consumption is remarkably uniform, while its production and value are the very reverse, fluctuating quite considerably. When the price is high, there is always an excess of production; in consequence of this, a sudden decline takes place which again induces the manufacturer to reduce his output as much as possible, or to stop production altogether until he can resume it with some hope of profit.

2. *The Manufacture of crude Milk-Sugar or "Sugar-sand."*

The manufacture of milk-sugar is carried on almost exclusively in two stages:

* During the year 1878, I put on the market a new preparation, under the name of *Lactin*, which contains, besides milk-sugar, suitable proportions of those salts in which cow's milk is deficient when compared with woman's milk. Hence this preparation, if mixed with cow's milk, furnishes a product as closely as possible imitating woman's milk. This preparation has found much favour in Switzerland; but its introduction in other countries has been retarded or interfered with by worthless imitations.

1. Preparation of "sugar-sand" (*Zuckersand*), and
2. Crystallization,

which are usually effected in different localities and by different persons.

The manufacture of "sugar-sand" is carried on in the same Alps of the Swiss Cantons of Berne, Freiburg and Luzerne, which produce the best Swiss cheese. According to the locality, the whey to be worked at one time differs in quantity between 300 and 1000 litres (about 80 to 260 gallons). Every morning the milk just collected, as well as that of the previous evening, is poured from the milk pails directly into the "cheese kettles." When the casein has been separated, the remaining whey is heated to boiling, whereby a cream-like skin is formed on top, which is made to increase in quantity by the rapid addition of acidified whey ("whey vinegar"). The skin ("Vorbruch") is skimmed off and worked for butter. The addition of the acidified whey produces a partial separation of the albuminoids ("Zieger") from the whey, and the butter fat is at the same time more completely raised to the surface.

Next follows the separation proper ("breaking") of the whey by the addition of more of the acidified liquor, about 15 litres for every 500, and gradual heating to incipient boiling. If this process is properly performed, the albuminoids will now rise to the surface in large lumps, the whey* will lose its white colour and appear as a limpid, greenish liquid ("Schotte") covered with the coagulated albuminoids. The latter is skimmed off and the liquid portion transferred into the "sugar kettle." The quantity of whey ("Schotte") amounts to about 70 per cent. of the original milk.

A "cheese kettle" is suspended from a crane so as to permit its being quickly removed from the fire at the proper moment. These copper kettles are always imbedded more than one-half in the fire-place. For boiling down ("sand-boiling," *Sandkochen*), kettles with very flat bottoms are selected, and these are permanently set in the stone-work in such a way that the fire can touch only the bottom. This arrangement prevents the fire from coming in contact with any portion of the kettle above the contents, which would rapidly burn or blister the copper. Sometimes two such kettles are set up over one fire-hearth. Grates are not used under any of these kettles in the Alps.

The mason-work consists of stones held together by clay. As may naturally be supposed, only wood is used as fuel, in the form of roughly split logs or roots. Its consumption is so great that the boiling of the sugar can only be carried on profitably in those Alps where there is an abundance of forests. But in some places, even there, the industry is forbidden on account of its consuming wood required for domestic or other purposes.

Five hundred litres (132 gallons) of whey ("Schotte") require, for boiling down, 1 cubic metre (1·3 cubic yard) of logs. The boiling in the sugar kettle is continued day and night, without intermission: as soon as the contents of the kettle have been removed, it is immediately charged with a new quantity of whey ("Schotte").

The boiling reduces each charge to about one-fifteenth of its original bulk, and leaves a brown, viscid, sweetly saline mass, the condition of which is judged from the manner in which a sample drops from a dipper. When it has arrived at the proper degree of concentration, it is dipped out into a tub where the sugar will crystallize out after twenty-four to forty-eight hours, if the operation has been properly conducted. The salts remain in solution, but the "sand" (crystallized sugar) retains a sharp saline taste, which is removed by stirring it with a sufficient amount of very cold water, allowing to settle, and decanting the liquid. The "sand" will then have acquired a bright-yellow, almost white colour. It is now filled into a sack from which the excess of water still retained by it gradually drains off. As soon as a sack is filled—which depends on the quantity of whey operated on, and may require from two to eight days—it is carried down into the valley and sent to the refiner, who goes by the usual appellation of sugar-manufacturer ("Zuckerfabrikant"). Sometimes the whole of one summer's turn-out of "sugar sand" is sold or contracted for in advance.

The strongly saline, residuary liquids constitute an excellent fertilizer, being rich in potash and phosphoric acid. They contain every inorganic constituent necessary for the growth of plants, and are therefore as perfect a nourishment for the latter, as the milk itself is for man.

The quality of the whey ("Schotte")—which should above all be clear and sweet—the manner of setting the kettles, and the whole manipulation of the boiling, all have a share in the success or failure of the process. It happens not unfrequently that the Alpine operator is compelled to give up the work altogether.

When the boiling is badly managed, the syrup in the kettle throws up foam, its volume, in spite of the continued boiling, becomes greater, and it acquires a darker colour. On cooling such a syrup, it yields a jelly-like mass, intermingled with but a small quantity of sugar crystallized in form of grains of about the size of small shot. When properly boiled, 100 litres (26½ gallons) of whey ("Schotte") yield on an average 3 kilogrammes (6 lbs. 9¾ ozs.) of washed, drained, and marketable "sand." There is some difference between the amount of sugar obtainable from Alpine whey, and that from low-land whey; the former averaging 3 to 4 per cent., the latter 2½ to 3 per cent. in summer, and 2 to 2½ per cent. in winter; though, when badly managed, the boiling may yield only ½ per cent. or thereabouts.

It frequently happens that the "sand" is sent off quite wet, so that it begins to drip again during the transport. In this case, it still contains from 15 to 20 per cent. of water. Since it readily becomes mouldy while wet, it is important that it should reach the refiner as soon as possible. In consequence of the dripping and the evaporation of moisture, the weight of the "sand," when delivered, is always less than when shipped; hence it is customary to settle in the contract where and by whom it is to be weighed. If it is sent by rail, the railway weigher's figures at the place of destination are usually taken as standard.

The price of "sugar sand" varies, according to the quality and the rate of demand, between 70 and 160 francs per 100 kilos.

3. *The Refineries of Milk-Sugar.*

There are five manufacturers, that is, refiners, of milk-sugar, in the Canton of Luzerne, all of them located in the same village, Marbach, where this industry seems to have sprung up originally, and where it has been transmitted as an heirloom in the same families. These manufacturers are at the same time peasants or tavern-keepers, carrying on the manufacture only during the summer, mostly with their own hands or their own people. When they are compelled to employ help, they usually engage a weak-minded or half-witted fellow, for the sake of preserving the secret of their process.

According to the demand and price of the sugar, the manufacturers buy or contract for the "sugar sand," in the spring, from the alp-keepers, in larger or smaller quantities, at higher or lower prices, for the ensuing summer. These bargains are concluded with a closeness and secrecy which is quite characteristic of these people:

* The author of the paper employs the term "Molken" in the ordinary sense of the English *whey*, being the whitish opalescent liquid remaining after the separation of the casein. This liquid, after further treatment to separate the albuminoids and the remainder of the fat still present, finally yields a transparent, greenish liquid, which the author terms "Schotten" or "Schotte." This name is often used promiscuously as a synonym for whey. But in the special sense in which the author uses it, there is no English equivalent. We have translated it in doubtful cases by "whey (Schotte)."—*Ed. Am. Drug.*

neither the seller nor the purchaser will ever divulge the contract price agreed upon. Neither is the purchase of the refined sugar from these people a simple or pleasant job. To a verbal question: "At what price do you sell!" the answer may be returned: "Likely, you know the price well enough, as you have been around to other manufacturers already."—"How much have you to sell?"—"Think I shall have enough to satisfy you," etc., etc. Moreover, it is quite a task to obtain a sight of a sample.

Besides these aristocrats among the manufacturers, there are other more recently established sugar manufacturers in Switzerland, who manufacture a purer quality of milk-sugar, in whiter and larger crystals, in order to be able to compete with the former.

The old manufacturers produce, together, about 50,000 to 60,000 kilos (110,000 to 130,000 lbs.), the new ones perhaps an equal quantity; hence, the total yearly product in Switzerland amounts to 100,000 to 120,000 kilos (220,000 to 264,000 lbs.), at a value of 200 to 300 francs per 100 kilos (40 to 60 dollars per 220 lbs.); sometimes also ruling lower.

Outside of Switzerland, sugar of milk is produced only in scattered localities in Austria, Italy, France, and Germany; but the quantity produced in all these countries amounts to at most only one-third of that produced in Switzerland. A very white milk-sugar, "Saccharum Lactis Germanicum," is made in Silesia (Germany), which is, however, said to be, for the most part, recrystallized Swiss sugar. This extra-fine, white article, which used to bring about fifty per cent. more in price, is at present almost completely displaced by the first quality of Swiss sugar, which is at the same time cheaper. The Italian manufacture has not been able to survive, in spite of many experiments, and even under the protection of a considerable duty. In the Austrian alpine province of Tyrol, and in the French province of Savoy, it is carried on but sparingly, not even the home demand being fully supplied. There is a factory in Savoy, working with a Piccard's evaporating-apparatus, in which the steam arising from the evaporation of the whey ("Schotte") is compressed, by means of a pump, in a copper-worm situated in the kettle, where it becomes condensed and thereby gives out the requisite amount of heat for producing an equal weight of new steam from the whey ("Schotte"). Although this system is economical and of advantage in other lines of manufacture, it is unsuited for the preparation of milk-sugar. In the first place, it requires a large outlay for steam boiler, water-power (or steam-engine), and evaporating-apparatus. In the second place, a profit can be expected only if a very large quantity of whey—say 5000 to 10,000 litres (1300 to 2600 gallons) per day—can be expected to be delivered. I say "expected" on purpose, because the delivery itself is connected with further difficulties. To obtain such a large quantity of whey, it must be brought together from a large number of different cheese works, some of them at a distance of perhaps ten kilometres (6 miles), which increases the expense. And a single lot of whey from abnormal milk accidentally mixed with the rest may spoil the whole quantity.

According to my own extensive experience, the yield and quality of product depends also a good deal on the kind of vessels used for boiling, on the quantity of whey boiled at one time, and the time consumed in boiling, and I have found that none of the requisite conditions are fufilled by using Piccard's apparatus. I am acquainted with the latter, through inspecting a factory in the Canton of Freiburg, which failed three years ago. This factory was said to be an exact copy of that in Savoy, and only worked for a short time; as soon as capital ceased to find an attraction to it, it collapsed, with liabilities amounting to 80,000 francs.

A number of years ago I established works, at an expense of 5000 francs, for boiling down a daily quantity of 2000 to 3000 litres (520 to 790 gallons) of whey ("Schotte") and refining the sugar, and I kept my works going summer and winter, employing sometimes even the whey ("Schotte") obtained from makers of Limburg cheese. Since my apparatus was built with a view of using steam, I erected them in connection with steam cheese works, saving thereby the special erection of a boiler. My yearly output amounted to 10,000 kilos (22,000 lbs.), and found ready purchasers, particularly for the United States. Since my engagement in another branch of technical chemistry, my works and apparatus have remained unused.

4. *The Refining of Milk-Sugar.*

Immediately after arrival at the factory, the "sugar-sand" is rewashed and then allowed to drain. The wash-water dissolves a considerable quantity of the sugar, the latter being no longer imbedded in or enveloped by the saline and sticky mother liquid, as during the first washing by the alp-keeper. Hence the manufacturer does not throw away the wash-water, but recovers the dissolved milk-sugar by boiling down. The extent of washing depends upon the tint which the finished sugar is required to possess, a darker tint resulting from short washing, and a lighter tint from repeated washing. If the sand has a brown colour, in which case it is usually crystallized in coarse granules, mere washing is insufficient, and a white product can be obtained only by recrystallization. This accounts for the preference which manufacturers show towards those alp-keepers who turn out white and finely granulated "sugar-sand." When the sand has been properly washed and drained, it is dissolved in water, in a kettle set like that previously described, and more of it is gradually added, until the solution has acquired the density most favourable for crystallization. This is not recognizable by the eye as readily as the end of the operation in boiling down the whey ("Schotte"); nevertheless the old manufacturers do not use any areometers. Usually a quantity of dark coloured crystallized milk-sugar (recovered from the mother liquors) is dissolved at the same time with the other. During solution, a dirty foam rises to the surface, which is constantly removed until finally only a slightly tinted skin forms on top. In order to insure the more complete separation of impurities, it is customary to add some clarifying substances. As soon as the solution has attained the proper condition of purity and concentration, it is transferred, while still boiling hot, into copper lined or solid copper vessels which may be of any size and form.

Discarded cheese-kettles, of a capacity of 200 to 1000 litres (50 to 260 gallons), are often employed for this purpose; or old stills, or square wooden boxes lined with copper, etc. Smaller vessels, of a capacity of 300 litres (80 gallons) and less, are embedded in wood ashes, whereby the cooling is retarded, and its rate much more regular than when it is freely exposed. The crystals thus obtained from the smaller vessels will then turn out to be as well formed of those obtained from the larger. For the purpose of getting handsome crystalline groups, it is necessary to provide for a sufficient number of crystallizing "points," which is done by hanging into the liquid sticks of wood of the diameter of a goose-quill, which are stuck, in intervals of about 12 centimetres (4¾ inches), through holes in a frame laid across the top of the vessel. Concentrated solutions, of course yield a larger quantity of crystals than more dilute ones. If an equal number of sticks be placed into two solutions differing only in density and contained in equal-sized vessels, the thinner liquid will yield thinner plates of crystals at the sides and bottom, and "grapes"* of lesser diameter than the thicker solution. But the product, in the former case, is lighter coloured than in the latter. The size of the single crystals, or in other words, the grain, depends on the rapidity of cooling and the clearness of the solution. After about ten days, the crystallization is completed; the mother liquid is then drawn

* This is the long corn-cob-shaped mass of crystals attached to the sticks.

off, which must be done rapidly, since the motion into which it is put by drawing off causes it to deposit a further quantity of milk-sugar in powder, which is apt to spoil the handsome appearance of the crystals. The sugar is now washed with fresh water, and then dried at a moderate temperature, which must be done thoroughly, otherwise the sugar will become mouldy. The crystalline plates taken from the bottom of the vessels require to be further purified, since they contain at their under surface any impurities which had settled at the bottom before the crystallization began. This impure layer is chopped off the pieces with a hatchet.

The mother liquid is again concentrated to the crystallizing point, and treated exactly as at first. The second crystallization yields a darker-coloured finely crystalline product, which is always redissolved along with a fresh lot of crude sugar. The mother liquid left after this second crystallization is boiled down to "sand;" bnt this is usually of so impure a character that it must be subjected to a preliminary purification before it can be utilized for obtaining marketable sugar.

All attempts to manufacture crystalline milk-sugar directly from whey ("Schotte"), on the principle of making loaf-sugar from beet-juice, have failed to lead to practical results. The difficulty is this, that not only the whole of the albumen and fat, but also the milk-salts and the lactic acid must be removed, and that the milk-salts which, by their presence, interfere greatly with the crystallization of the sugar, amount to one-half per cent. in the whey ("Schotte"), or to 10 per cent. of the weight of the sugar itself.*

Still more impracticable appears the proposition to precipitate the milk-sugar in the whey ("Schotte") by alcohol. In the first place, at least *four* volumes of alcohol would be required for precipitating it in *one* volume of whey; and further, the precipitate would be contaminated by accompanying albuminoids, and would, therefore, have to be purified. Besides, a considerable amount of fuel would have to be consumed for the recovery of the alcohol, and more or less of the latter would be lost.

The manufacture of milk-sugar, like that of maple-sugar, with which it has many points in common, is not capable of being locally centralized beyond a certain limit. Besides other impediments already mentioned, an additional one is the limited consumption of the product. Until this has acquired much larger proportions, it is probable that the opinion of an old manufacturer, that "Sugar-making is profitable only where the manufacurer is his own workman," will maintain its authority.

THE EMPLOYMENT OF LUPINE SEEDS AS CATTLE FOOD.†

BY EDWARD DAVIES, F.C.S., F.I.C.

The seeds of *Lupinus luteus* have lately been introduced into this country, and proposed for use as food for cattle. The large amount of albuminoids contained in these seeds would seem to show great feeding value but, unfortunately, there are reasons for thinking that their use is undesirable. The subject has recently been brought specially under my notice, and I have made some investigations into what is known about it.

The natural order Leguminosæ, although containing many plants yielding seeds used as food, also contains a number of poisonous plants such as Laburnum, Calabar Bean, etc. Even in those plants whose seeds are used for food, in some cases poisonous principles are found in other parts of the plant.

Any seeds belonging to plants of this order should therefore be looked upon with suspicion. Lupine seeds are used on the Continent as cattle food, but they are so frequently found to be injurious, that the name of "lupine sickness" has been given to a disease arising from their use. It has been described as causing symptoms similar to those of acute jaundice and of phosphorus poisoning, and it is said that convalescence seldom occurs. Not only sheep, but also horses, dogs and goats are attacked. The spleen, kidneys, heart and muscles, are all affected by the poisonous action.

The most elaborate work on the chemistry of lupine seeds appears to be that of Baumert. He obtained an alkaloid named "lupinine," $C_{21}H_{40}N_2O_2$, which is a crystallizable solid, a strong base liberating NH_3 from NH_4Cl, paralyses nerve centres, is very caustic, and in combination intensely bitter. It boils at 255° to 261° C., and distils unaltered in steam or hydrogen.

Attempts have been made to remove this poisonous substance. O. Kellner recommends to soak in water twenty-four hours, steam for one hour, and wash for two days with frequent stirring and renewal of the wash water. Ripe seeds lose 15 to 20 per cent of their dry weight by this process, which is too long and troublesome to be practically useful, though it is contended that not only are they rendered non-poisonous, but that they are made more digestible.

On the whole, the introduction of the seeds is to be deprecated.

NEW METHODS FOR DETECTING CHLORATES IN SOLUTION.*

BY M. FOURMONT.

A solution containing a chlorate, when mixed with sulphuric acid and copper turnings, assumes a green colour; while a solution of nitrate, under the same conditions, at time evolves nitric acid, and turns blue.

The Solution contains the Chlorate only.—When the solution is treated with copper and sulphuric acid, perchloric acid is produced, and cuprous chloride is formed, which colours the solution green. If the absence of acids which precipitate argentic nitrate has been previously established, the presence of a chlorate is proven.

The Solution contains a Chlorate and a Nitrate.—The treatment is the same. The chlorate is first decomposed, with the evolution of perchloric acid and a green coloration; then hyponitric acid escapes, and the characteristic blue colour of the nitrate appears.

The Solution contains a Chlorate and a Chloride.—After the presence of the latter has been determined by argentic nitrate, the chlorate is detected as above. It is unnecessary to remove the chloride first.

The Solution contains a Chlorate, a Chloride, and a Nitrate.—If this solution is treated as above, all three salts are decomposed. Hypochlorous acid, hydrochloric acid and nitric acid are liberated at the same time. The latter two give nitrohydrochloric acid, which dissolves the copper as chloride, and colours the solution green. If the presence of a chloride has previously been determined by means of argentic nitrate, one might be led to believe that the solution contains a chloride and a chlorate. When the solution is heated for a few minutes, the green colour of the chloride disappears, and the blue colour of the nitrate is produced. According to this reaction, the presence of a chlorate, a chloride and a nitrate might be assumed, but the latter two themselves will give the same reactions, on account of the formation of nitrohydrochloric acid. The author therefore recommends that the hydrochloric acid be previously removed by argentic acetate, and the other two acids detected in the given manner.

* One hundred parts of whey contain:

Milk-sugar	4·5 to 5·0
Lactic acid	0·2 ,, 0·5
Nitrogenized substances and fat	0·5 ,, 1·0
Salts	0·5 ,, 0·7
Water	94·2 ,, 92·8

The specific gravity of the whey is 1·026 to 1·028.

† Paper read before the Liverpool Chemists' Association.

* From *Journ. de Pharm.* Reprinted from the *Weekly Drug News*, November 22.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 6, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ALTERABILITY OF CHLOROFORM.

NOTWITHSTANDING the development of a considerable amount of opposition to the use of chloroform as an anæsthetic that compound remains one of the most important articles in the materia medica. Nevertheless it is known to be one of the most prone of compounds to undergo change when kept under ordinary conditions, whilst it is possible at the same time that the change may not only impair its efficacy as a medicine, but render it positively deleterious. Any information, therefore, as to the conditions most favourable to the stability of chloroform will be welcome to all purveyors of medicine. From this point of view the results of an investigation by M. JULES REGNAULD spreading over the last eighteen months, recorded in the December number of the *Journal de Pharmacie*, although in part only confirmatory of what was previously known or suspected, appear to be worthy of being brought under the notice of our readers. For this purpose it will be convenient to divide the experiments described into two classes, those having for their object to ascertain the causes of the decomposition of chloroform and those that were made to determine what means, if any, could be used to retard or prevent its alteration.

Of the first class were the experiments made to determine the effect of exposure to sunlight and air. Before describing these, it may be stated that for the purposes of the investigation two samples of purified chloroform were used, one of them prepared in the ordinary way, and the other from chloral hydrate. Both had been freed from alcohol and water by distillation over sodium; the final rectification had been effected in the dark at a temperature between 60° and 61° C., and they had subsequently been preserved from exposure to sunlight. Portions of these samples of chloroform, when introduced into dry flasks and exposed to contact with air and to sunlight, either direct or diffused, gave evidence of decomposition after an interval of two days in the month of July and five days in December. A similar result followed when the chloroform used had been previously saturated with water by agitation. But the corresponding contents of flasks which were kept entirely in the dark, after having been tested forty times during a period of fifteen months, were found at the end of that time to maintain their initial properties, not showing the least alteration or containing the least trace of chlorine, hydrochloric acid or carbon oxychloride. These results, therefore, leave little doubt, if any existed, as to the active part played by sunlight in the decomposition of chloroform in contact with atmospheric air. Indeed the disturbing effect appears to be produced with great rapidity, since chloroform which had been exposed during only half a day to diffused sunlight, and then placed in a dark cupboard, was found to have undergone alteration at the end of five weeks. Another set of experiments had for their object to determine the relation of oxygen to the decomposition, and for this purpose chloroform was exposed in sealed flasks to atmospheres of oxygen and of nitrogen during sixteen months, the flasks being placed sometimes in direct and sometimes in diffused sunlight. At the end of that time the chloroform that had been in contact with oxygen had undergone decomposition, whilst that which had been in contact with nitrogen was found still unaltered. It would appear, therefore, that just as pure chloroform will remain unaltered—at least for a considerable time—in contact with atmospheric air, if sheltered from the action of light, so also it may be exposed freely to the action of sunlight if it be preserved from contact with the oxygen of the atmosphere. These experiments, it will be seen, are confirmative and extensive of the opinions of English and German chemists relative to the influence of atmospheric oxygen and sunlight upon the stability of chloroform; but they also show incidentally that alteration takes place independently of the presence of chloral, as the most rigorous precautions were taken to remove the last traces of this compound from the chloroform used.

The experiments in the second class mentioned demonstrate, in the opinion of M. REGNAULD, that chloroform to remain unaltered in the pharmacy cannot be absolutely pure. Among the recognized agents for preventing the action upon it of air and light ethylic alcohol occupies the first place, and experiments were made to ascertain the proportions in which it requires to be added to be effective. Portions of the same samples of pure chloroform which, when exposed to air and sunlight without addition underwent change in two days in summer and five days in winter, were placed in flasks together with pure ethylic alcohol in the proportion of 1 in 100, 1 in 500 and 1 in 1000 of its weight. After exposure to light for fifteen months, during which time each flask was opened forty times for testing, it was found that not the slightest alteration had in any case taken place, even in the chloroform containing only 1 part in 1000 of ethylic alcohol. Being curious to ascertain whether this preservative property is shared by other alcohols, M. REGNAULD made similar experiments with some that he was able to obtain sufficiently pure. Chloroform to which

methylic alcohol had been added in the proportion of 1 in 100 remained unaltered at the end of fifteen months, whilst a specimen containing 1 part in 200 underwent change in two months, and another containing 1 part in 1000 broke down in sixteen days. The results with amylic alcohol were not more favourable. On the other hand, the preservative properties of allylic alcohol were comparable to those of ethylic alcohol. The last experiments to which we shall refer were made with two hydrocarbons, benzene and toluene, which, notwithstanding their relationship, gave widely different results, benzene proving almost, if not quite, devoid of any preservative influence, whilst chloroform to which toluene had been added in the proportion of 1 part in 1000 showed no signs of alteration at the end of sixteen months. The author offers no explanation of these phenomena at present, but holds out a hope hat he may do so on some future occasion.

A statement made by the President, when the report of the Benevolent Fund Committee was under the consideration of the Council on Wednesday last, appears to be worthy of special notice as bearing upon the question that has been raised as to whether approved candidates should be allowed to canvass for votes, and confirming the opinion we expressed last week that any future increase in the income of the Fund depends largely upon personal local effort. It referred to the fact that a daughter of one of the candidates had been working to obtain subscriptions to the Fund, presumably in the hope that the votes of the new subscribers would be given for her father, and, as a result, has transmitted to the office, from a limited district, no less than one hundred and seven subscriptions, amounting to £81 14*s.* 6*d.* We understand that the person who was thus energetically helped was the candidate who headed the poll at the election on Friday.

* * *

At an Evening Meeting to be held in the house of the Pharmaceutical Society, 36, York Place, Edinburgh, on Wednesday next, the 10th inst., a paper will be read on "The Estimation of Spirit of Nitrous Ether," by Mr. D. B. Dott, and a "Note on the Estimation of the Oxides of Mercury," by Messrs. Dechan and T. Maben. The chair will be taken at half-past eight o'clock.

* * *

The discussion of Dr. Sheen's paper on the relations of the medical profession still continues. Dr. Walter Snell, in the *British Medical Journal* this week, expresses an opinion that it is not on account of medical men dispensing their own prescriptions that druggists engage in prescribing to add to their incomes, but because during recent years "several branches of their legitimate trade" have been taken from them by drapers, grocers and universal providers. At the same time he admits, rather inconsistently, that "prescribing among druggists is not increasing, rather the reverse." Dr. Snell also refers to the disturbing influence of the abuse of the outpatient departments of hospitals and dispensaries, and says that as long as thousands of people, many of whom are able to pay a moderate fee, are every day supplied with advice and medicine for nothing, it is not to be expected that they will consult a private practitioner or have their medicines dispensed by the druggist.

* * *

At the October meeting of the Victoria Pharmacy Board the subject of the illegal sale of opium by Chinese dealers was considered, upon the presentation of a report by the Secretary stating that convictions had been obtained against fourteen such persons in Melbourne, three in Ballarat, three in Maryborough, and five in Castlemaine. The question as to the propriety of the Board issuing certificates to any Chinese allowing them to sell opium was raised, and eventually it was resolved to adopt a suggestion that had been made by the Attorney-General not to renew or grant certificates under the Victoria Sale and Use of Poisons Act to Chinese when those in force until the end of the present year shall expire.

* * *

At the anniversary meeting of the Royal Society on Monday last, the chair—in the absence of the President, Professor Huxley, through illness—was taken by the Treasurer, Mr. John Evans. In the course of a long and interesting address, the Chairman, referring to the subject of the metric system, said: "Whatever may be the advantage of the metric system from a scientific point of view, the question whether a scale of weights, money and measures, which in its lowest denominations follows a duodecimal rather than a decimal system, is not better adapted for the convenience of daily life, is one that by many is regarded as fairly open to discussion."

* * *

In the current number of the *Pharmaceutische Zeitung* Herr Bernbeck calls attention to the fact that menthol pencils are now met with containing an admixture of thymol as an adulteration. The characters of thymol in regard to solubility in ether, alcohol, chloroform, etc., resemble those of menthol, so that it is necessary in examining a mixture of the two substances to have recourse to treatment with sulphuric acid. For this purpose the suspected substance is mixed with four times its weight of sulphuric acid, and in the event of its containing thymol the presence of this substance is indicated by a deep rose coloration on warming the mixture. If the solution is then mixed with ten times its volume of water and digested with an excess of lead oxide the filtrate gives a fine violet colour on the addition of some drops of ferric chloride solution. A solution of the suspected substance in chloroform and alcohol acquires a reddish violet colour when heated with caustic potash solution.

* * *

An announcement in the new number of the *Journal de Pharmacie et de Chimie* conveys the information that henceforth it will appear fortnightly instead of monthly, one of the reasons given being that discoveries now become old in a month, having before that time been published and commented upon in every direction. The fortnightly parts will each consist of three sheets (48 pp.), whilst the monthly part has hitherto contained five sheets.

* * *

At the next meeting of the Chemists' Assistants' Association, December 10, at 9 p.m., at 103, Great Russell Street, a paper will be read by Mr. C. E. Stuart, B.Sc., entitled "How Plants Grow."

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 3, 1884.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Messrs. Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Squire, Symes, Williams, Woolley and Young.

The minutes of the previous meeting were read and confirmed.

Resignation of Mr. Andrews.

The President read the following letter received from Mr. Andrews:—

"24, Leinster Terrace, W.,
"*29th November*, 1884.

"Dear Mr. President,—It is with much regret that I feel compelled to resign my position as one of the Council of the Pharmaceutical Society. But I am at present, and shall for a few months to come, be so much engaged, as to find it absolutely impossible to give that amount of time and attention, which are necessary for the proper performance of the duties of the office.

"I am, dear Mr. President,
"Very truly yours,
"Frederick Andrews.

"To the President of the Pharmaceutical Society."

After a brief conversation, the following resolution was moved by the President, seconded by the Vice-President, and carried unanimously.

"That this Council regrets having received the resignation of Mr. Andrews, and desires to record its appreciation of the services rendered by him to the Society as a member of this Council."

The Institute of Chemistry.

The President stated that a communication had been received from the Privy Council Office, containing a petition and a draft charter which had been received by the Department from the Institute of Chemistry of Great Britain and Ireland, and asking if the Council had any observations to make upon it.

After some conversation in committee,

The President moved—

"That the thanks of this Council be tendered to the Lords of Her Majesty's Privy Council for submitting to it the petition and draft charter of the Institute of Chemistry of Great Britain and Ireland, and that this Council sees no objection to the granting of such charter."

The Vice-President seconded the motion, which was carried unanimously.

Appointment of Board of Examiners.

The President read the following letter from Mr. Sidney Plowman:—

"St. Thomas's Hospital,
"Albert Embankment, S.E.,
"*November* 27th, 1884.

"To the President and Council of the Pharmaceutical Society of Great Britain.

"Gentleman,—I beg to inform you that I have accepted a medical appointment in St. Thomas's Hospital. Although this is not accompanied by any emolument, I nevertheless feel it my duty to request you not to re-elect me a member of the Board of Examiners for 1885.

"I wish to express my very great regret that owing to this appointment I am unable to continue to serve the Society as an Examiner.

"I am, Gentlemen,
"Your obedient servant,
"Sidney Plowman."

The Council went into committee to consider the above letter and the bye-laws bearing on the subject.

On resuming,

The President moved—

"That this Council desires to express its regret that Mr. Sidney Plowman is unable again to accept office as an Examiner, and wishes to place on record its high appreciation of the services rendered to the Society by Mr. Plowman during the six years he has been a member of the Board of Examiners for England and Wales. It further congratulates him on the success he has attained in his new sphere of work."

The President said Mr. Plowman had been a Bell Scholar, and though the members of Council must all be sorry to lose him from pharmacy, they could never forget that since he had been connected with the Society, as a student, pharmaceutical chemist and examiner, he had done credit to it.

The Vice-President cordially seconded the motion, not merely because Mr. Plowman was a personal friend of his own, but because in the interests of the Society and pharmacy generally he very much regretted the necessity for Mr. Plowman's retirement from the Board of Examiners. Mr. Plowman was not only a Bell Scholar, but a Pereira Medallist, and had taken other prizes, so that he was one of those educated by the Society of whom they must all be proud. He very much regretted that the present rules compelled Mr. Plowman to leave the Board and hoped at some future time a modification might be made in that direction.

Mr. Schacht said when Mr. Plowman was first appointed an examiner he was a little anxious about his qualifications, inasmuch as he considered him rather young for the post; but having shortly afterwards been elected Vice-President, and being a good deal in the examination room, he made it a point to ascertain, as far as possible, the qualifications of the various members of the Board, and he very soon found that his anxieties with regard to Mr. Plowman were quite groundless. His high opinion of him increased every month he visited the room, and he believed that the Society was losing in him one of the most efficient members of the Board. Mr. Plowman had all the qualifications, both personal and scientific, which were required in an examiner, and the Society was unfortunate in being obliged to lose him. The members of the Council must all congratulate him on entering a somewhat more exalted sphere of life, but he could not help feeling that it was a certain misfortune to pharmacy that so many of the best men should leave it.

The motion was carried unanimously.

The Council then went into committee to discuss fully the names of gentlemen who were mentioned as most likely to fill satisfactorily the vacancy created by Mr. Plowman's resignation.

Ultimately on a ballot being taken the following were appointed subject to the approval of the Privy Council:—

England and Wales.

Barnes, James Benjamin, 1, Trevor Terrace, Knightsbridge, S.W.
Benger, Frederick Baden, 7, Exchange Street, Manchester.
Corder, Octavius, 31, London Street, Norwich.
Ekin, Charles, 2, Lampton Road, Hounslow.
Fletcher, John, Montpellier Avenue, Cheltenham.
Gale, Samuel, 225, Oxford Street, W.
Gerrard, Alfred William, University College Hospital, W.C.
Greenish, Thomas Edward, 5, Bathurst Street, Sussex Square, W.
Linford, John Samuel, 16, Gladstone Street, Hull.
Southall, William, 17, Bull Street, Birmingham.
Symons, William Henry, 2, Queen's Terrace, St. John's Wood, N.W.

Tanner, Alfred Edward, High Cross, Tottenham, N.
Taylor, George Spratt, 13, Queen's Terrace, St. John's Wood, N.W.
Thresh, John Clough, 11, Eagle Parade, Buxton.

Scotland.

Baildon, Henry Bellyse, 73, Princes Street, Edinburgh.
Clark, William Inglis, 26, South Back, Canongate, Edinburgh.
Gibson, Adam, High Street, Leven, N.B.
Gilmour, William, 11, Elm Row, Edinburgh.
Kinninmont, Alexander, 69, South Portland Street, Glasgow.
Maben, Thomas, 5, Oliver Place, Hawick.
Nesbit, John, 162, High Street, Portobello.
Stephenson, John Bertram, 48, North Frederick Street. Edinburgh.

A further resolution was passed thanking the members of the respective Boards of Examiners for their services during the past year.

Restorations to the Register.

The names of the following persons who had severally made the required declarations and paid a fine of one guinea were restored to the Register of Chemists and Druggists:—

William Ross Smith, 2B, Princes Road, Liverpool.
Roscoe Charles Spurin, 28, Portland Square, Plymouth.

Reports of Committees.

FINANCE.

The report and recommendations of this Committee were received and adopted and sundry accounts were ordered to be paid on the motion of the President.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to a former member and subscriber to the Fund, aged 70, suffering from heart disease and with an invalid wife. Applicant has had two previous grants. Warwickshire.

£5 to the widow, aged 36, of a registered chemist and druggist, having four children. Applicant has had four previous grants of £10. Yorkshire.

£10 to the widow, aged 40, of a registered chemist and druggist, who was in business eleven years. Warwickshire.

£5 to a registered chemist and druggist, aged 58, in ill-health. Has had nine previous grants. Renfrewshire.

£15 to the widow of a registered chemist and druggist, aged 44, having five children, one of whom has just been elected to the Infant Orphan Asylum without the expenditure of the money which was voted three months ago for the purpose. Bucks.

One case had been deferred.

The Committee also recommended that £5, the proceeds of Mr. Robbins's special donation, be given to Mr. Charles Tucker, he being the annuitant who had subscribed the largest amount to the Benevolent Fund.

The Vice-President, in moving the adoption of the report, gave some particulars of one of the cases.

The report and recommendations were received and adopted unanimously.

The President read the following letter from the widow of the late Mr. Peter Squire, enclosing a cheque for £100 for the Benevolent Fund.

"Basmead Manor, St. Neots,
"*December* 1, 1884.

"Sir,—I enclose you a cheque for one hundred pounds which I wish you to receive as a legacy to the Benevolent Fund from the late Peter Squire. Although my husband omitted to mention it in his "Will," I am only carrying out his wishes in sending this cheque to you.

"I remain,
"Yours faithfully,
"M. C. Squire.

"To the Treasurer of the Pharmaceutical Society."

The President also reported that he had received a cheque for twenty guineas from the Committee of the Dinner of Scotch Pharmacists held in Edinburgh in connection with the opening of the Society's new house, the sum being the balance left after paying the expenses.

The President also stated that a relative of one of the candidates for an annuity had in one small district obtained one hundred and seven new subscriptions to the Benevolent Fund, amounting to £81 14*s.* 6*d.* This showed what could be done by individual effort.

LIBRARY, MUSEUM, LABORATORY, AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
October.	Day	427	24	9	16
	Evening	270	20	6	11

Circulation of books.	No. of Entries. Town.	Country.	Total.
October	193	90	283

Carriage paid . . . . . £1 9*s.* 9½*d.*

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Roberts (F. T.), Notes on Materia Medica and Pharmacy, 1884. From the Author.

Nass (P.), Ueber den Gerbstoff der Castanea vesca, 1884.

Rautenfeld (P. von), Ueber die Ausscheidung des Strychnins, 1884.

Seidel (A.), Studien über die Darstellung, Zusammensetzung und Eigenschaften des Sennits (Cathartomannits), 1884.

From Professor Dragendorff.

The Committee recommended the purchase of the undermentioned works for the Library:—

Everett (J. D.), Elementary Text-book of Physics, 2nd ed., 1883.

Frankland and Japp, Inorganic Chemistry, 1884.

Husemann, Pflanzenstoffe, 2e Aufl., 1882–84.

Throat Hospital Pharmacopœia, 4th ed., 1881.

The Spitalfields Genius: The Story of William Allen, by J. Fayle, 1884.

Curator's Report.

The Curator had reported the attendance in the Museum during October to have been:—

	Total.	Highest.	Lowest.	Average.
Morning	522	35	7	19
Evening	256	22	3	9

The following donations to the Museum and Herbarium had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Twelve specimens of native remedies from the Congo. From Sir James Marshall.

Four varieties of vegetable tallow from Sumatra. From Mr. F. O. Forbes.

Specimens of the oils of *Camellia oleifera*, *Elæococca cordata*, *Perilla ocymoides*, *Brassica splenes*, and whale oil, and of the starches of *Pteris aquilina*, *Pueraria Thunbergiana*, *Erythronium grandiflorum*, and some seaweed products from Japan. From Mr. K. Nagai, Japanese Commissioner at the International Health Exhibition.

Specimens of the resins of *Cedrus Libani* and *Pinus Laricio*, indigo from *Polygonum tinctorium*, gum of *Khaya Senegalensis*, and seed-pods of *Parkia biglobosa*. From the Directors of the Royal Gardens, Kew.

Herbarium specimen of *Polygala Senega*, var. *latifolia*, and two specimens of Senega root. From Messrs. Merrell, Thorp and Lloyd, Cincinnati.

Specimen of Rio ipecacuanha.
From Messrs. WRIGHT, LAYMAN AND UMNEY.
Specimen of oil of limes.
From Messrs. KUHNER, HENSCHEL AND Co.
Specimen of the endocarps of *Prunus occidentalis* from Jamaica.
From Messrs. BURGOYNE, BURBIDGES, CYRIAX AND FARRIES.
Specimens of the following Brazilian drugs:—*Chenopodium ambrosioides*, *Scoparia dulcis*, *Solidago vulneraria*, "Baliera," "Cambara," and Brazilian vanilla.
Herbarium specimens of *Artemisia Cina* from Taschkent. From Professor FLÜCKIGER.

It was recommended that Messrs Butler and Tanner's estimate for printing the catalogue of the Library be accepted, and that the type be kept standing so that additions may be made from time to time as required.

Also that twelve herbarium cases be ordered for the Museum, in which to keep specimens given to the Society.

The Professors had attended and reported satisfactorily of their respective classes.

Estimates for the Calendar and Register for 1885 were submitted, and it was recommended that 1600 Registers and 900 Calendars be printed.

The PRESIDENT, in moving the adoption of the report, explained the new arrangements proposed with regard to the publication of the Library catalogue. He also referred to the herbarium cases.

The motion was seconded by Mr. GREENISH and carried unanimously.

THE PROPOSED NEW BYE-LAWS.

Mr. HAMPSON asked in reference to a notice which appeared on the agenda, that "Draft of proposed Bye-Laws to be considered," whether it was intended to adopt the proposed bye-laws or simply to discuss them and defer their adoption to another meeting. He was under the impression from the wording of the agenda that the latter course would be adopted, and had made arrangements accordingly. The alterations made were so important that he did not think sufficient time had yet been allowed members of Council to consider the subject so as to come to a decision.

Mr. BORLAND thought that further time ought to be allowed before a decision was come to. Those members who were on the Bye-Laws Committee had had this matter under consideration a long time, no doubt, but many of the members of Council had only had them under their notice during the last few days, and to enter on their consideration with so many proposed alterations would, he thought, not be doing justice to the report of the Committee, and to those gentlemen who had been considering the subject for months.

Mr. RICHARDSON concurred with previous speakers that it would not be right to take this matter at the tail end of the meeting, at 4 or 5 o'clock, and decide upon it. He should not be able to be present himself, and the subject was also of sufficient importance, in his opinion, to have a special meeting of the Council called to discuss it without any other business.

Mr. SAVAGE regretted that these bye-laws were placed before them as they were, without having the new portions distinguished by italics.

Mr. SCHACHT said there was no desire that this matter should be hurried or brought to a premature conclusion, but he hoped the desire for delay did not arise from an intention to oppose the proposed changes by delaying further consideration of the matter until the Greek Kalends. He should be quite content that it should be postponed till the next meeting, but if the postponement were desired only because some gentlemen had to leave early the difficulty might be got over by asking the President to change the order of proceedings and take it immediately. He should be sorry that the consideration of the bye-laws should be altogether postponed.

Mr. HAMPSON hoped Mr. Schacht would acquit him of anything like a factious opposition; but these new bye-laws certainly required ample time for consideration. He had not yet had sufficient time to give them such consideration, though if it were decided to discuss them he must remain. But he did object to that method which Mr. Schacht, and those who thought with him, proposed to take, viz., to come to a decision on this very important subject at the very tag end of the agenda; if it were simply for consideration well and good, but the changes were so important, and many of them not at all urgent, that ample time might be allowed for considering them.

The PRESIDENT said the decision come to that day must depend on the result of the discussion.

Mr. HAMPSON saw no occasion to be precipitate in coming to a decision.

Mr. SCHACHT said he did not wish to be precipitate at all. At the last meeting the report of the Committee was printed, and it was understood that a copy should be sent to each member, so that the question might be proceeded with that day.

Mr. BORLAND said there really had not been time for those who were not members of the Committee to do justice to this important document. The various bye-laws were so closely connected together that the matter could not be simply dealt with by going through them clause by clause, and he would be doing greater justice to those who drew up the bye-laws if more time were allowed. He would, therefore, move that the consideration of the proposed bye-laws be postponed until January or a later date.

Mr. WILLIAMS said that having had occasion to write to the Secretary during the month he reminded him that this document had not been distributed as ordered, and that it was very important that members of the Council should have it in their hands before the meeting of the Council. In reply he was informed that the Secretary had only that day obtained the proof from the Solicitor, in whose hands it had been to give the final corrections to it, and, therefore, it could not go to press earlier. He gathered from that that the document in its present form had not been submitted to the Committee again since it had received its final touches from the Solicitor. No doubt the President had taken care that it was consistent with what the Committee desired, but there was a little appearance of hurry as the members had not received it until late in the month.

The PRESIDENT, having explained the circumstances that had led to some delay in obtaining the proofs, said that if the feeling of the members was in favour of postponing the matter he did not think anyone would object, so long as it was understood that it was not postponed for an indefinite period. With regard to the place this question occupied on the agenda paper, it was necessary to dispose of the formal business first.

The VICE-PRESIDENT, as a member of the Committee, thought it very desirable that the request for further time should be acceded to. Those who were on the Committee had a certain advantage over those who were not, and, therefore, he thought Mr. Borland's appeal was a very natural one, and, as a member of the Committee, he should support it on the understanding that it was not anything in the nature of factious opposition. Still he thought a great deal more light would be thrown on the matter by discussing it together, and by having an explanation on certain points from the Chairman, than if members were left simply to study the report in their own homes. He, therefore, suggested that it would be as well to have the bye-laws read, and then the further action postponed, and perhaps call a special meeting to consider them.

Mr. SYMES thought it would be wise to have the document read, and comments made on it with the understanding that any further discussion should be postponed.

Mr. BOTTLE also supported the same view. It would

be well to have just a running comment on the document and then fix a special meeting of the Council to consider it.

Mr. BUTT suggested this might be taken the day after the next Council meeting.

Mr. YOUNG thought it would be a pity to have a special day appointed, unless in the sense that it should be on some such day of meeting when other work should be put aside so that the main part of the day might be devoted to it.

Mr. HAMPSON hoped that he would be acquitted of any intention to obstruct business.

The VICE-PRESIDENT said he had not imputed any motive to any gentleman. He suggested that the President should give an outline of the changes proposed, and that then the subject should be deferred till the next Council meeting, when it should be so arranged that all other business could be got through early, leaving the whole afternoon to consider this question.

Mr. SCHACHT said that was all that he desired, and it was understood that this course should be taken.

HOUSE (SCOTLAND).

The report of this Committee stated what had been done with regard to the alteration and furnishing of the Society's new premises, York Place, Edinburgh; and recommended that the expenditure of a moderate amount be authorized on the stable attached to the premises when a suitable tenant was found for it.

The Council went into committee whilst the President gave certain details as to what had been done.

The PRESIDENT moved that the report and recommendations of the House Committee (Scotland) be received and adopted. He reminded the Council that the rooms were opened on Thursday, the 13th of November, when a most successful conversazione had been held. All the work and preparations in connection with that were most admirably carried out by the House Committee (Scotland) and the Secretary, Mr. MacEwan. A very pleasant evening was spent, and he thought the result would be very conducive to the purposes for which the Society bought the house. He might also say, though this was scarcely official, how graciously those who went down were received by their Scottish brother-pharmacists. Where there was so much cordiality, it was, perhaps, a little invidious to single out names, but there were three gentlemen who specially laid themselves out to entertain the visitors, viz., Messrs. Young, Buchanan, and George Mackay, and their self-devotion had impressed not only himself, but all his colleagues, and the officers of the Society who were present. The result of the visit was certainly a pleasurable one, and one which would tend to advance the interests of the Society in Scotland.

The VICE-PRESIDENT seconded the motion. Having been one of those who went to the north, he was in a position to endorse every word uttered by the President with regard to the business portion of the arrangements, and also on the social side of the question. He believed that now Scottish pharmacists had entered on a new departure of increased usefulness and activity; the premises which had been secured were a very good investment, and, so far as he could judge, they would afford ample facilities for the advancement of scientific pharmacy. One reason he should like to adduce why he thought it important that a new departure should be taken affording facilities of increased development. The President and himself had the privilege, in conjunction with Dr. Paul, of going over the university extension with Professor Fraser, and it was very gratifying to see the marvellous provisions which had been made for the teaching of chemical science in Scotland, and the prosecution of original research; anything more elaborate or extensive he had never seen. Now, if pharmacists claim, as they were practically admitted to have a right to claim, to be an integral part of the guild of medicine, it was important, as the higher branches had thoroughly prepared themselves for advanced scientific teaching, that they, as pharmacists, should do as much as they could in the same direction. He felt that they had now vast facilities for the promotion of scientific pharmacy in the north which did not previously exist. With regard to the social side he could say no more than had been said by the President, except that having stayed there a little longer he might say perhaps the same thing even more strongly.

Mr. RICHARDSON, having also been one of the visitors to Edinburgh, wished to add his feeble voice in acknowledgment of the reception given them by their Scottish friends. It was no new thing to him to be received kindly in Scotland, but the warmth of the reception certainly exceeded his expectations. He should also like to allude to the extreme care which seemed to have been exercised in adapting the new house for the purpose required. He was astonished to find the house so well arranged, so suitably furnished in every possible way, so that it was little inferior to the building in which they were assembled.

Mr. ROBBINS said that since he came back from Scotland he had felt somewhat uncomfortable that he unfortunately came away without having the opportunity of thanking their kind friends before he left, but he thought probably he should see Mr. Young that day, and that something would be said in Council on the matter. He was very much delighted with the manner in which they were all received, and anyone must be hard to please who was not more than satisfied. Not only in Edinburgh but in Glasgow also they were most kindly received. The premises were beautifully fitted up and well adapted for the purpose required; the investment was one of the best that had been made in the interest of the Society. By this acquisition the Scotch Board would be able to increase its importance, and the opening of these premises would, he thought, be a red letter day for the gentlemen North of the Border, and one worthy to be recorded in the future annals of pharmacy.

The PRESIDENT said he had forgotten to add one word with regard to the report, namely, that the room on the ground floor, which was to be used as a library, was only furnished with a very ugly book-case, which was not adequate to the purpose required. He would, therefore, add to the motion that suitable book-shelves be fixed in the library.

After some further discussion, the motion, as amended by the President, was carried unanimously.

Mr. BORLAND said it was only due on his part, as a Scotch member who had not been concerned in carrying out these alterations, to express to the Council the great satisfaction of those in Scotland at the very handsome way in which the Society had behaved towards them in buying and fitting up these premises. They certainly felt there was a great duty now laid upon them to do still more to further the interests of pharmacy, and to add to their number as far as possible. They were now placed in a very different position to any they had held before, having already won the respect of many medical gentlemen and others whose influence would be a great assistance to them.

GENERAL PURPOSES.

The report of the Committee contained the usual letter from the Solicitor stating the progress of cases which had been placed in his hands. Several cases of alleged infringement of the Pharmacy Act had been considered by the Committee, and proceedings were recommended to be taken.

The report and recommendations of the Committee were unanimously adopted on the motion of the President.

THE LATE MR. PETER SQUIRE.

The PRESIDENT read a letter which he had received from Mr. Balmanno Squire, offering to place at the disposal of the Council a medallion of his father with a suitable inscription, and moved that—

"Mr. Balmanno Squire's present to the Society of a

bronze medallion bearing the likeness of his late father be accepted, and that the thanks of the Council be given to Mr. Balmanno Squire for the gift."

This was carried unanimously.

THE CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

The PRESIDENT also read a letter which he had received from the Secretary of the Chemists and Druggists' Trade Association, enclosing a resolution that the Council of the Pharmaceutical Society be requested to receive a deputation from the Association to confer with them as to the expediency or otherwise of further pharmaceutical legislation. He suggested that the deputation should be received on the Tuesday before the next Council meeting.

The Council went into committee to consider the letter.

On resuming, it was resolved that the proposed deputation be received at 4 o'clock on Tuesday, January 6.

THE BYE-LAWS.

The draft of the proposed bye-laws was then read and explained by the President in committee, and the further consideration thereof adjourned till the January meeting of the Council.

EVENING MEETING.

Wednesday, December 3, 1884.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The third Evening Meeting of the present session took place on Wednesday last, the 3rd inst.

The minutes of the previous meeting having been read and confirmed, a paper was read on—

LIQUID EXTRACT OF CINCHONA.

BY PROFESSOR REDWOOD.

The paper is printed on p. 441, and gave rise to the following discussion:—

The PRESIDENT, in inviting a discussion, said that he presumed that Professor Redwood in speaking of extraction of red cinchona bark with acid and water meant extracting by percolation, as stated in his former paper.

Professor REDWOOD replied in the affirmative.

In reply to a remark made by Mr. Schacht, Professor REDWOOD stated that the glycerine added to the extract was intended for preservative purposes.

Dr. PAUL said that he had listened with very great pleasure to the paper. He could not say that he had found much matter in it calling for criticism beyond the remarks which he had already made on the subject of liquid extract. He ventured to think that he perceived in this paper signs of a progressive conversion, which, if continued, promised to terminate in leaving no point of difference of opinion between Professor Redwood and himself. Still there were some points in regard to which he held opinions very different from those of Professor Redwood, and he would take this opportunity of stating precisely what that difference was. With regard to the material employed for the extraction, he would remark in passing, that some acknowledgment was due to Dr. De Vrij, inasmuch as it was he who had especially recommended the use of hydrochloric acid as a means of extracting bark for various purposes. It had been his (Dr. Paul's) business on various occasions to inquire into the use of that acid for extracting bark for analytical and manufacturing purposes, and for the preparation of liquid extract, and in every one of those respects he had come to the conclusion that the use of hydrochloric acid as a means of extraction had been a failure. He considered that its use was based upon a fallacious idea, which, to his knowledge, had led to incalculable mischief. The hydrochloric acid preparation of cinchona bark that had been brought before them by Professor Redwood was obtained by a process which was essentially that recommended by Dr. De Vrij, a process which had been in operation for years upon the Continent for preparing a liquid extract. In a recent discussion it was remarked by Mr. Giles, who had had some experience of this process, that he doubted entirely the possibility of extracting bark with hydrochloric acid in the proportions to which Professor Redwood had referred. He (Dr. Paul) concurred in that view, and he further thought that the proportion of acid recommended by Dr. De Vrij, which was double that used by Professor Redwood, was also insufficient. His experience led him to say that, in operating upon red bark, whatever was the fineness of the powder used, weak acid failed to extract more than one-half of the alkaloids. The reason of the failure was not that the acid did not percolate through the bark, but that the alkaloids were present in states of combination which rendered them insoluble in weak hydrochloric acid. Another objection to the use of hydrochloric acid for the preparation of a liquid extract was that it deranged the natural combinations in which the alkaloids existed in the bark itself. Medical authorities who had given the results of their observations on the use of bark constantly stated that, useful as quinine was in a pure state, there was some undefined and unascertained influence exercised by the substances naturally associated with quinine in cinchona bark and by the state of combination it had in the bark which made it much more useful in that state than in any other. According to his chemical ideas, such an agent as hydrochloric acid must necessarily result in destroying cinchotannate of quinine, or other cinchotannates of cinchona alkaloids, or any weak compound of that kind; and, in using it in the preparation of liquid extract of cinchona it would follow that at the very utmost, if they extracted the cinchotannic acid they would have it in a liberated state and not in the condition in which it existed in the bark. Quite recently he had made some experiments on red bark of various qualities, ranging from 3 per cent. to 6 or 7 per cent., and invariably with the result that the amount of alkaloid left behind was nearly, if not quite, 50 per cent. of the alkaloid actually contained in the bark.

The PRESIDENT said that Professor Redwood stated in his paper that he obtained 90 per cent. of the total alkaloids by his process. Other experimenters had not succeeded in obtaining so much; they had not obtained more than 50 per cent. Could Professor Redwood suggest any explanation of the discrepancy?

Professor REDWOOD said that he was quite certain that the amount he had stated was correct. He had made very numerous experiments, and they had been confirmed by his very competent assistant, who had worked independently. He (the Professor) had assayed the bark by the process which was well-known as De Vrij's process, treating it with lime and alcohol, and he determined the proportion of total alkaloids which he got out by that means. He then took some bark in a state of fine division, not larger than No. 60 powder, and treated it with hydrochloric acid, first macerating for four hours with hydrochloric acid and water, and then percolating. He then took the product of the percolation, and he got out nine-tenths of the quantity of total alkaloids he had previously got out by De Vrij's method. He then treated the residual bark by De Vrij's process, and it yielded the one-tenth which he had failed to get out. He did not speak at all in qualified terms as to the proportion extracted.

Dr. SYMES said that the liquid which Professor Redwood obtained by maceration and percolation was evaporated to a solid extract, and the advantage which Professor Redwood pointed out was that the solid extract was capable of being used as such, or of being used for the preparation of a tincture, or for the preparation of a fluid extract. The difficulty which he (Dr. Symes) found in things which were useful for so many purposes was that they frequently failed to accomplish any one thing to the very utmost satisfaction. If Professor Redwood attempted to produce fluid extract only, the process might

be somewhat simplified. For instance, the liquid might be evaporated to a given weight or a given bulk, instead of being brought to a solid extract, and he could conceive that the addition of glycerine in that case would be decidedly advantageous. He had used glycerine for a long time. He believed that most of those who had had anything to do with galenical preparations looked upon glycerine not as a preservative agent, but as valuable by preventing the precipitation of resinous substances, and also by preventing anything like burning or caking on the sides of the evaporating pan when a liquid was being carried to a high state of concentration. It was well-known that in evaporating a decoction of bark, a certain portion of the liquid would get more or less dried on the sides of the pan in spite of constant stiring, and in such a case a small portion of glycerine was highly valuable. With regard to the assay of bark, in a note recently read at a meeting of the Liverpool Chemists' Association, it was stated that maceration was very much better than boiling for a long period, and that, instead of attempting to exhaust the bark by percolation, if there were, say, 6 ounces of liquid to 200 grains of bark, and if 3 ounces of the liquid was taken and analysed they would get the percentage at once, and save a great deal of trouble in carrying out the estimation. He had had no experience in the assay by means of maceration as compared with boiling.

Mr. C. H. Wood said, with reference to the remarks of the last speaker, that, in the process which Professor Redwood had put forward for the assay of the bark, maceration would not answer, and boiling was absolutely necessary. He was very sceptical of the efficacy of any process for assaying bark in which maceration at ordinary temperatures was adopted. With regard to the method of taking a fractional part of the liquid, it was a very perfect method when sufficient precautions were taken, but there were two objections to it as a pharmacopœia method. In the first place they would have to employ a very efficient condensing arrangement during the boiling, to make certain that none of the solvent had evaporated. The whole apparatus would have to be weighed before the boiling and afterwards, and then they would have to take some aliquot part of the liquid, such as a half or two-thirds. As far as he understood the matter, the chief difficulty of giving a method suitable for the Pharmacopœia for the analysis of a bark was, that the method ought to be one which could be employed upon a comparatively small quantity of bark, if it was to be of such a kind that most pharmacists could employ it. They would prefer a process by means of which an analysis could be made with sufficient accuracy with about half an ounce. Where succirubra bark was selected they required to determine more than the total alkaloids. There was such a thing as succirubra bark which contained a very large quantity of cinchonine and very little else. The bark of the root, which could be produced in very large quantities, if necessary, was rich in cinchonine, but had very little of the other alkaloids. If for each experiment they took not more than 200 grains of bark, on the supposition that the bark did not contain more than 3 per cent. of quinine and cinchonidine together, they would not get more than 6 grains, and if they took an aliquot part they would get even less than that—not more than 3 grains. It was difficult to get out so small a quantity and precipitate and collect and wash it, and conduct the process with accuracy. For these reasons it was better to exhaust the whole of the bark instead of taking an aliquot part. As to the disputed question of the proportion of alkaloids that could be dissolved out of the bark by hydrochloric acid, he certainly was rather surprised to hear that anything like 50 per cent. of the alkaloids was left in the bark. He quite admitted that bark might be treated with dilute hydrochloric acid, and that only about half of the alkaloids would be extracted; but on the other hand, he thought that he had very strong evidence that it was quite possible to treat bark with dilute hydrochloric acid and take out, practically, the proportion which Professor Redwood had stated. He had treated many thousands of tons of bark in that way, and he was quite sure that much more than half of the total alkaloids had been extracted. Some recent experiments had been made in India in which a hybrid bark (not a true succirubra) had been treated very much in the manner described by Professor Redwood. The bark was reduced to powder and macerated with dilute hydrochloric acid. He understood that Professor Redwood had mixed his bark with hydrochloric acid, at a temperature of 180°, and then percolated. In the experiments to which he had referred something very similar to this had been done, and a bark of which an analysis showed between 4¼ and 4½ per cent. of sulphate of quinine, the residual bark, after the process had been completed, yielded 0·6 per cent. He should imagine that the proportions were very nearly the same as those referred to in the paper. He should certainly imagine that Professor Redwood was correct in saying that he had got out nine-tenths of the alkaloids.

The President inquired whether Mr. Wood had ever examined the residues of the bark after the action of the hydrochloric acid and water.

Mr. Wood said that he had examined a long series in that way. He had ascertained that if they mixed bark with hydrochloric acid and water in a percolator, or moistened the bark with such a mixture and put it into a percolator and percolated it with water, they would not, he thought, get out more than one-half. In the first place they must have a previous maceration, and as far as his observation had gone there must be maceration with a considerable bulk of liquid, and the process of percolation must not be performed in the way in which it was frequently performed, in which the powder was moistened just enough to swell it and then transferred to a percolator. The matter was one of considerable difficulty and uncertainty, and unless the operation was conducted under the most favourable conditions it was frequently a failure.

Mr. Ekin asked whether Professor Redwood could explain why, if hydrochloric acid was a perfect solvent, there should be even as much as 10 per cent. of the alkaloids left in the bark. It was stated that this particular solvent extracted from 50 to 90 per cent. He supposed that it was more than an "open secret" that Professor Redwood's experiments in this direction would practically determine the liquid extract in the next Pharmacopœia; and one could not help being sorry that Professor Redwood's experience had not enabled him to see any other way out of the difficulty than adopting what he (Mr. Ekin) regarded as the retrograde method of breaking up all the natural combinations of the bark. The present liquid extract had faults enough; that now proposed was a totally different thing, but it would not represent what a liquid extract ought to be. He wished that the Professor could see some way of doing away with hydrochloric acid altogether, and would propose some solvent which would really bring out the cinchona alkaloids as they existed in the bark.

Mr. Cownley said that Mr. Wood seemed to be of opinion that weak hydrochloric acid would extract all the alkaloids from the bark. It must, however, be understood that Professor Redwood used a very weak solution of hydrochloric acid. In a paper published in the *Pharmaceutical Journal* he (Mr. Cownley) had shown that such a solution employed in the way directed by Professor Redwood left a large proportion of the alkaloid in the residual bark. Professor Redwood had suggested that the reason why he (Mr. Cownley) had not succeeded in extracting more than 50 per cent. of the alkaloids by means of hydrochloric acid, was that the bark was not in a sufficiently minute state of division, or that it was too rich in alkaloids. He had, however, used bark in a state of the finest division possible, and had since experimented on barks containing only 3 per cent. of alkaloids; and yet

he had come to the conclusion that it was impossible to extract 90 per cent. by using the weak hydrochloric acid which Professor Redwood claimed to be effective. Rather than use hydrochloric acid and still leave alkaloids in the bark, he did not see why they should not retain the liquid extract of cinchona of the present Pharmacopœia.

Mr. HAYLES said that, as assistant to Professor Redwood, he had treated the barks precisely in the manner which Professor Redwood had told him, and had arrived at precisely the same result as the Professor himself, namely, the extraction of nine-tenths of the total alkaloids.

Mr. GERRARD said that some of the differences of result which had been obtained by different observers might be due to the use of cinchona barks drawn from different sources, but that would not explain the wide differences which had now been mentioned. He thought that the extract now proposed had its merits, and that, before it was condemned, the astringent matter which it contained should be estimated, and that that contained in the liquid extract of the Pharmacopœia should be also estimated. It might be that the new extract contained a quantity equal to the extract of the Pharmacopœia. The chief objection to the new extract was that it would contain free hydrochloric acid unless the free acid was entirely dissipated in the course of evaporation. The presence of the free acid would be incompatible with the use of the extract in combination with alkaline carbonates.

Mr. HOLMES asked Professor Redwood whether he had submitted any of his extract to the opinion of the medical profession.

Professor REDWOOD, in reply to the discussion, said that he had been asked why he should deviate, in regard to a proposed process for liquid extract of bark, from a process which would yield the active constituents of the bark in the state of combination in which they existed in the bark. He wished that he could answer that question, but he would appeal to the gentlemen who had put it, and ask them whether they would answer it. He had come to the meeting to meet his co-scientists, and had detailed to them the results of his investigations, and he would ask those gentlemen who had put questions to him whether they were prepared to do the same. If they were not, they had no right to criticize his paper upon this particular subject. Another question which had been asked was whether he could explain why the remaining 10 per cent. of the alkaloids did not come out. He had attempted to explain the fact in two ways. It was quite clear to him that hydrochloric acid did not exhaust the bark as readily and completely as an alkali or an alkaline earth and alcohol did. The bark on which he operated was not in an impalpable powder, but in little masses, and these might offer some mechanical resistance to the percolation of the liquid; but on the whole, the most rational explanation seemed to be that which Dr. Paul and he (Professor Redwood) had both suggested. He had two or three times talked about quinovin and quinovic acid and cinchona red, and Dr. Paul had talked about extract of kino or something analogous to it. He had been working every day for months upon the exhaustion of cinchona barks by various means, and occasionally he got an extract like kino or catechu, something which agglutinated in the evaporating dish and which there was great difficulty in breaking up. It might be assumed that there were constituents of this kind which retained some of the alkaloids, and which could not be easily broken up by dilute hydrochloric acid. If he took the bark in very fine powder and used strong acid with heat, he could exhaust it and take out the whole of the alkaloids. It further appeared that some and perhaps much of the discrepancy between the results of different observers might be due to the fact to which Mr. Gerrard had referred, that they were not all working with the same bark. In his early experiments he used flat red bark, and from it he obtained results which were different from those yielded by his late experiments with selected barks. He now eschewed flat bark, and used quilled bark from the stems and not from the roots. Root bark was a different thing altogether. He was told there was no difficulty in getting an adequate supply of selected barks which would contain just the alkaloids he had alluded to, and not contain an undue proportion of quinovin, and red cinchona and quinovic acid. His colleague (Professor Attfield) had suggested to him that it might not be inappropriate to state that he (Professor Redwood) had brought forward this subject entirely on his own responsibility. It would be taken cognizance of, although it had not been finally decided, by the authorities who had the bringing out of the new British Pharmacopœia. He had brought the subject forward in the hope that he should be able to obtain from the able practical pharmacists who were present some suggestions which would aid him and his colleagues, and the Pharmacopœia Committee and the Medical Council, in deciding what should be the process of the next pharmacopœia. Someone had thrown out a hint that this was the process. He begged to say it was nothing of the sort. It was simply a process which he had himself elaborated, and he had not at present submitted it to his colleagues.

The PRESIDENT said that he was sure that the meeting would not wish the subject to be exhausted in three or four meetings. The paper had not satisfied him that the process was a perfect one, though Professor Redwood might be on the right way. He was sure the meeting would accord the Professor a cordial vote of thanks for his paper.

The vote was carried unanimously.

SALTS OF HOMOQUININE AND CUPREINE.

Dr. PAUL called attention to a series of specimens on the table, illustrating the different characters of the salts of homoquinine and cupreine already described in this Journal some weeks ago. He said that in comparing these salts, one of the chief points to be noted was the circumstance that the crystalline or the amorphous condition was not uniformly the characteristic of the salts of homoquinine or those of cupreine, as might perhaps have been expected if homoquinine were really a compound substance containing quinine as a constituent. This was shown in a marked manner by the hydrochlorates and the nitrates, the respective cupreine salts alone being crystallizable, while the corresponding salts of homoquinine are amorphous and, in this respect, therefore, much less like the quinine salts than those of cupreine are. On the other hand, the oxalate of homoquinine being crystalline and the hydriodate being amorphous, they are more like the corresponding salts of quinine than those of cupreine are. A further remarkable peculiarity of cupreine is its solubility in alkaline solutions, for instance, caustic soda, and this was shown by adding to a solution of cupreine sulphate first a few drops of strong caustic soda solution sufficient to precipitate the alkaloid, and then a considerable excess which completely redissolved the precipitate formed in the first instance. The very considerable solubility of cupreine in caustic soda solution was further illustrated by the addition of dilute sulphuric acid to such a solution having the effect of converting the liquid into a semi-solid mass of cupreine sulphate, this salt being much less soluble in water than the alkaloid is in a 10 per cent. solution of caustic soda.

Mr. GERRARD exhibited an apparatus which he had devised for determining the nitrogen in urine. A figure of the apparatus, together with a description, will be given next week.

The meeting then adjourned to Wednesday, February 4, 1885.

GENERAL MEETING—BENEVOLENT FUND

ELECTION OF ANNUITANTS.

A General Meeting of the Members, Associates in Business, and Associates of the Pharmaceutical Society and of the Subscribers and Donors to the Benevolent Fund, was held at the house of the Society, 17, Bloomsbury Square, on Friday, December 5, at 12 o'clock, for the election of SIX ANNUITANTS.

Mr. MICHAEL CARTEIGHE, President, in the chair.

The notice convening the meeting was read.

Scrutineers were appointed, who examined the voting papers and brought up the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the twentieth election of Annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us and report the following result:—

Sanders, George Lee	4003
Davis, Francis	3717
Cooke, John	3474
Fowler, Sarah Anne	2785
Davies, Caroline C.	2233
Glynn, Elizabeth P.	2203
Braithwaite, Annie E.	1711
Johnson, George T. F.	1117
Stephenson, Thomas	736
Read, Robert Elimelech	723
Goadsby, Elizabeth	525

4033* voting papers were received, of which number 74 were informal (53 unsigned) and were disallowed.

GEORGE S. TAYLOR, *Chairman.*

CHARLES J. MEAD.	WM. D. MAYGER.
CHAS. B. ALLEN.	R. FISHER YOUNG.
W. PICKARD.	WALTER HILLS.
W. I. GULLIVER.	J. J. CHAPMAN.
R. A. ROBINSON.	WM. WARREN.
W. H. SYMONS.	JNO. T. TUPHOLME.
T. HOWARD HALL.	THOMAS RICH.
E. NORTHWAY BUTT.	EDWD. B. STAMP.
CHAS. E. TURNER.	SIDNEY CONSTANCE.
WM. TOOGOOD FROST.	ROBERT ROWE.

December 5, 1884.

The President declared the following six duly electe l Annuitants:—

Cooke, John.
Davies, Caroline C.
Davis, Francis.
Fowler Sarah Anne.
Glynn, Elizabeth P.
Sanders, George Lee.

A vote of thanks was given to the Scrutineers for their long and arduous duties.

* 5923 voting papers issued.

Provincial Transactions.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

A meeting of the Executive Committee was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on Wednesday, November 26, at 12.45 p.m. Mr. John Harrison (Sunderland), President, in the chair. Mr. W. G. Cross (Shrewsbury), Vice-President.

Present—Messrs. Andrews (London), Arblaster (Birmingham), Barclay (Birmingham), Bell (Hull), Chapman (Scarborough), Churchill (Birmingham), Davis (Leamington), Hampson (London), Jervis (Sheffield), Laird (Edinburgh), Parker (Nottingham), and the Solicitor of the Association.

The minutes of the previous meeting of the Executive Committee were read and confirmed.

The business commenced with the appointment of the following Committees for the ensuing year:—

General Purposes.—The officers of the Association, together with Messrs. Andrews, Arblaster, Barclay, Bell, Chapman, Davis, Ellinor, Hampson, Holdsworth, Jervis, Maltby, Parker, Pasmore, Symes, Walker, Williams and Yewdall.

Law and Parliamentary.—The officers of the Association, together with Messrs. Andrews, Arblaster, Barclay, Bell, Chapman, Davis, Jervis, Hampson, Parker, Symes and Walker.

Finance.—The officers of the Association, together with Messrs. Arblaster, Barclay and Holdsworth.

Mr. Henry Glaisyer was re-appointed Solicitor to the Association for the ensuing year.

Mr. W. F. Haydon was re-appointed Secretary and Mr. Alfred Wright Assistant-Secretary to the Association.

Professor Attfield was re-appointed Analytical Referee to the Association for the ensuing year.

Messrs. Lloyds, Barnetts and Bosanquet's Banking Company, Limited, were re-appointed Bankers to the Association, and Messrs. Laundy and Co., Public Accountants, were re-appointed Auditors to the Association for the ensuing year.

Some considerable discussion took place as to the practice recently introduced by the Registrar of Trade Marks of accepting as trade marks common words in block type, when it was moved by Mr. Barclay, seconded by Mr. Davis:—"That the Secretary be instructed on the issue of each number of the *Trade Marks Journal* to print extracts therefrom of all trade marks proposed to to be registered under the Trade Marks Act, 1883, in classes 1, 2 and 3, and to forward a copy of the same to each member of the Executive Committee and request them to point out to him any proposed marks that would, in their opinion, if registered, be detrimental to the interests of the trade."

Mr. Hampson inquired what steps would be taken in the event of a member of the Executive deeming any proposed mark objectionable.

Mr. Barclay said that the Urgency Committee would deal with such cases and communicate with the Registrar if necessary.

Mr. Hampson said that he thought it would be unwise to relegate such power to the Urgency Committee, and he would therefore move as an amendment:—"That in the event of objection being taken by a member or members of the Executive to any proposed mark when advertised in the *Trade Marks Journal*, the Secretary be instructed to submit the objection to the Executive and not to the Urgency Committee." He said he adopted that course because he thought it was unwise that any Sub-Committee should communicate with a Government official and probably thereby pledge the Association. He thought such questions could be dealt with very much better by the Executive itself.

The amendment was seconded by Mr. Parker, and on being put to the meeting, three voted for and eight against it. The motion was then put and carried *nem. con.*

The Committee then appointed the Local Secretaries to the Association for the ensuing year.

It was moved by Mr. Barclay, seconded by Mr. Arblaster, and unanimously resolved:—"That the Council of the Pharmaceutical Society be requested to receive a deputation from this Association to confer with them as to the expediency or otherwise of further pharmaceutical legislation."

It was subsequently decided that in the event of the Council of the Pharmaceutical Society being willing to receive the deputation, it should consist of the officers of the Association, together with Messrs. Barclay, Bell, Maltby, Laird, Parker and the Secretary.

The Secretary said that he had recently reported to the Registrar of the Pharmaceutical Society a case of infringement of the 15th section of the Pharmacy Act, in which scheduled poison had been sold by an unregistered trader, the same being fully labelled, so that the Association had no power to commence proceedings for the recovery of a penalty; that the Solicitors of the Pharmaceutical Society had, acting under the instruction of the Council of that Society, commenced an action against the offender, and that the Assistant-Secretary would, if necessary, give evidence in support of that action.

Several letters were read from members of the Association, and the Secretary was instructed as to the manner in which he should deal with the same.

THE REGISTERED CHEMISTS' TRADE ASSOCIATION OF LIVERPOOL.

The annual supper in connection with the above Association took place on Wednesday, November 26, at Messrs. Fisk and Feurhurst's establishment, Castle Street.

After the tables had been cleared and the usual patriotic toasts disposed of, the President of the Association, Mr. Charles Symes, Ph.D., proposed "Success to the Registered Chemists' Trade Association of Liverpool." He said he had the honour to propose this the toast of the evening, and would couple with it the name of their Honorary Secretary, Mr. J. Hocken. The Registered Chemists' Trade Association existed, as its name would imply, for the special interest of those engaged in pharmacy, and he hoped that the interests of the members of the Association had not suffered at its hands. He hoped, too, that it did not fill a place which could be better occupied by another association. Its existence was as much to the interest of the public as it was to those engaged in the profession. That might appear an extraordinary thing to say, but he would call their attention to the fact that, by discussing subjects which affected their daily calling, they were better enabled to perform their duties to the public whom they serve. They had issued a price list that the public might not be treated unfairly, and that chemists might benefit too. When the Association was started some nine years ago, it was found necessary to display some energy to prove what good could result from its formation, and to show that it was required at all. New societies must always expect to have to do this, and this one had proved unmistakably its value to chemists themselves. It went about matters in a very quiet unobtruding way, hence he sometimes feared that it was forgotten. And in conclusion, he would say that it would be better if meetings of this kind occurred a little oftener. It was not to be understood that he wished the years should pass round more quickly, for they grew old soon enough, but that they should meet under similar circumstances more than once in the year.

Mr. Hocken, in responding, said he had replied to this toast on several previous occasions, and believed that he had expressed everything new that could be said. He would, however, thank them very much for the kindly manner in which the toast had been received by the large number of gentlemen present, and was pleased to state that in reply to the invitation he gave last year to non-members some increase had been made to the roll of members. He urged the claims of the Benevolent Fund—the voting papers for which had been received that day—upon the members generally, and said that from their not very extensive funds they had been able to make donations to that fund, and commended the example to similar associations.

Mr. R. Parkinson proposed the toast of "The Liverpool Chemists' Association and Kindred Societies." Mr. E. Davies, F.C.S., F.I.C., responded. "The Pharmaceutical Society of Great Britain" was proposed by Mr. J. J. Smith, and responded to by Mr. J. A. Turner. "The Chemists and Druggists' Trade Association of Great Britain" was proposed by Mr. H. Wyatt, and responded to by Councillor Woodcock. "The Wholesale Trade" was proposed by the Vice-President, and replied to by Mr. W. P. Evans.

The proceedings terminated at a late hour by the proposal by Mr. F. J. Mackinlay of "The Health of the President," who, in responding, referred to the loss which the Society has sustained by the deaths of Mr. Fingland and Mr. J. Edisbury.

The evening was enlivened by the rendering of a number of songs, violin solos, etc., under the able direction of Mr. Godfrey Marks and Mr. A. Sheriff.

Proceedings of Scientific Societies.

EDINBURGH UNIVERSITY CHEMICAL SOCIETY.

The first ordinary meeting of the Society, was held on Wednesday evening, November 26, when an able, and in many respects original, lecture was given by Professor Crum Brown, the subject being "Polarity and Enantiomorphism."

The lecturer first observed that it had not been sufficiently noted that there are two distinct kinds of polarity. If we take a section of a *cat's tail*, not too near the root or too near the top, but as cylindrical as possible, we find that it possesses *polarity, i.e.*, the order or arrangement of its parts is different as we proceed from one end or the other, which fact may be proved by drawing the hand along in either direction. When such an object is reflected from a mirror, the image is identical with the object. This kind of polarity, which is in the direction of the axis, may be called *cat's-tail polarity*. Suppose now, we look at a muff such as ladies wear, we observe that it has polarity like the cat's tail, but in this case the polarity is in a direction *round the axis*. When an article of this kind is held up between us and a mirror, the image appears reversed (differing from the tail) so that polarity round the axis may be described as *muff polarity*. Numerous models of crystals were shown to illustrate these facts; tourmaline, for instance, exhibiting cat's tail polarity, and scheeleite showing muff polarity. It was next pointed out that electric polarity is of the cat's tail kind, while magnetic polarity is of the muff order. Enantiomorphism was defined thus:—Two bodies are said to be *enantiomorphic* when they are identical in structure and proportions, but each of which will not fit the mould of the other: or otherwise, two bodies are enantiomorphic which are different, but of which the reflected image of the one is identical with the other. Chlorate of sodium was taken as a good example of a compound which forms enantiomorphic crystals. When two of these crystals are

examined by means of the polariscope, one of them deflects the ray of light to the right, the other to the left. If, however, a solution of each variety of crystal is made, it is found that the solutions are optically inactive and identical in every respect, showing that the difference is not molecular, but only in the structure of the crystal. When, on the other hand, the right handed and left-handed crystals of *tartaric acid* are separately dissolved, it is seen that the solutions are optically different, the one being dextrogyrate and the other lævogyrate. In this case the enantiomorphism is evidently related to a difference in the molecules. Reference was then made to the interesting fact that certain organisms are capable of distinguishing between the right-handed and left-handed varieties of some compounds. This was first observed by Pasteur, who found that the whole of the lævo-tartaric acid is removed from a solution by *Penicilium glaucum*, the dextro-tartaric acid being left behind. This observation was extended and turned to practical account by Le Bel in his investigation of the amylic alcohols. It has been similarly observed by a Russian chemist in his research on mandelic acid, that while *Penicilium glaucum* devours all the right-handed acid, another organism subsists only on the left-handed variety. Whence it is evident that there is often a kind of polarity present in those low forms of life.

The lecture was cleverly illustrated throughout, and enlivened by delicate touches of humour which cannot easily be reproduced.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, November 27, Mr. J. O. Braithwaite, Vice-President, in the chair.

Mr. T. S. Dymond read a paper on "The Preparation of Hydrargyrum cum Cretâ."

The author gave an account of the literature of the subject, especially with reference to the therapeutical action of grey powder. Most investigators had come to the conclusion that this was not due to the mercury, but solely to the oxides of mercury which the preparation always contains. The British Pharmacopœia gives tests to limit the amount of oxide and to insure the very fine division of the mercury. That process must be adopted for the production of grey powder, which produces an article that best conforms to these tests. Mr. Dymond had made experiments on four processes which were employed. These were:—1. The United States Pharmacopœia process, in which sugar of milk was employed to prevent oxidation, and ether and alcohol to aid the subdivision of the mercury. 2. A process in which the mercury and chalk were shaken together in a wide-mouthed bottle. 3. The process described in the British Pharmacopœia. 4. A process in which damp chalk was used instead of dry chalk. The conclusion was arrived at that the British Pharmacopœia process was the best, both because it was quicker and because the resulting powder was the most satisfactory.

At the conclusion of the paper, specimens prepared by the different methods were shown, and a discussion took place, in which the Chairman, Secretary, Messrs. Barnes, Dobb, Farr, Greenish, Hoyles and Huskisson joined.

The Reporter on Organic Chemistry, Mr. W. H. Ince, then made the following report:—

On the Easy Production of Methylic Hydride.

This method that I shall bring before you this evening is based on the old method of acting on one of the monohaloid derivatives of methane by nascent hydrogen, the only difference from the ordinary method being in the form of apparatus used.

The old method was simply adding the iodomethane to a mixture of zinc and sulphuric acid, washing and collecting the gas, or by acting on the iodomethane by zinc foil and copper. By both these methods much gas was lost, moreover it was not at all pure; in the latter, the zinc foil, owing to the expense, served as an obstacle.

Gladstone and Tribe found that by using ordinary granulated zinc covered with copper, in a suitable apparatus, as much as 99 per cent. of the theoretical yield of gas could be obtained unmixed with other impurities.

Their apparatus is made as follows:—Take a 3 or 4 oz. flask, and fill it with freshly granulated zinc, inserting in the neck a cork with two holes; in the one is placed a stoppered funnel and in the other a tube leading into a wide tube, also containing zinc; in the top of the wide tube is placed a delivery tube and a stoppered funnel.

The zinc is then washed with dilute sulphuric acid, and then with a 2 per cent. solution of copper sulphate, which deposits a fine film of copper over the surface of the zinc. The zinc-copper couple is then washed with water and finally with alcohol, and the apparatus is ready.

Owing to the difficulty of obtaining the whole apparatus air-tight, I slightly modified it, making all the tubes come to the top of the wide tube.

The methyl iodide, with an equal volume of alcohol, is dropped into the bottom flask and the following reaction takes place:—

$$CH_3I + Zn(Cu) + C_2H_5.OH = CH_4 + Zn\begin{cases} I \\ C_2H_5O \end{cases} + (Cu)$$

Methyl iodide + Alcohol = Marsh gas + Zinc iodoethoxide + Copper.

The upper tube is used simply to free the methane from any methyl iodide that would otherwise be carried over.

A discussion followed, in which the Chairman, Secretary, Messrs. Dymond and Greenish took part.

Miscellaneous Business.

Mr. Dobb brought under the notice of the Association a peculiarity in the behaviour of certain silver salts which he had noticed in the laboratory. Having added K_2CrO_4 and then excess of HCl to an ammoniacal solution of oxide of silver, he was surprised to see the precipitate of AgCl entirely redissolve in the excess of acid. He found that it was reprecipitated on diluting with water, or slowly deposited on standing, the CrO_3 being reduced.

Mr. Ince said he had found that AgCl was rather freely soluble in AmCl, and suggested that it was the AmCl formed which kept the silver in solution in Mr. Dobb's experiment.

Mr. Dymond thought the silver had probably formed a double salt with the ammonium.

The Chairman alluded to the difficulty experienced sometimes by makers of bismuth salts in getting rid of silver and suggested that Mr. Dobb should continue his experiments and bring the results under the notice of the Association.

The Chairman then gave notice that at the next meeting Mr. Huskisson would move an amendment to Rule V., so as to provide for a case of equality of votes at an election.

The Secretary announced that the Executive Committee had appointed the following gentlemen as a Committee of Reporters on Science for the present session:—Pharmacology, Mr. H. G. Greenish; Practical Pharmacy, Mr. R. A. Cripps; Botany, Mr. E. J. Eastes; Materia Medica, Mr. J. O. Braithwaite; Physics, Mr, H. Allen; Organic Chemistry, Mr. W. H. Ince; Inorganic Chemistry, Mr. P. L. Huskisson; Analytical Chemistry, Mr. C. Thompson.

The meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting was held on November 26, at 103, Great Russell Street, Mr. Winfrey, President, in the chair.

After previous minutes had been confirmed, and some new members proposed,

The President informed the members that Mr. Thomas Hyde Hills had been kind enough to present to the Association a portrait of the late Jacob Bell, to adorn the walls of their new premises. He felt sure the members generally would heartily concur with him in the thanks he had conveyed to Mr. Hills for his generous gift, and that they would treasure it not only as another proof of Mr. Hills's goodwill to the Association, but also because of its intrinsic value in keeping ever before their eyes the features of the talented founder of the Pharmaceutical Society, and ever alive in their hearts the lasting gratitude that was due from all pharmacists to this great prince of their profession.

A vote of thanks to Mr. Hills was carried by acclamation.

A paper on "Blowpipe Analysis" was next read by Mr. G. W. Watts. The paper treated of the systematic application of blowpipe reactions for the metals, etc., found in ordinary analysis, including the detection of arsenicum, whether occurring on the basilous or acidulous side, and its recognition in the presence of phosphates; the reactions of the alkaline earth metals and their detection in the presence of one another; the metals of the iron and copper groups, and the various flame and bead tests, together with a sketch of the means of recognition of the more important acidulous radicals which would be revealed under treatment.

A discussion followed, in which Messrs. Braithwaite, Burnett, Dodd, and Winfrey, took part.

After Mr. Watts had replied,

Mr. Braithwaite read "Notes on Some Uncommon Drugs." In introducing the subject to the meeting, the author remarked that he wished to imply by the title of the paper, that the specimens he would bring before them were, most of them, uncommon in the sense that they were not frequently met with in retail pharmacies. The first specimen described was Rio ipecacuanha, a small consignment of the roots of *Ionidium ipecacuanha* having been recently sent to the London market under this name. Attention was drawn to its physical and chemical properties, and to the employment of the allied *Ionidium microphyllum* in Peru, and of *I. suffruticosum* in India. A sample of cuscus root, the rootlets of the vettivert grass, *Andropogon muricatus*, was next exhibited, and the points of distinction between it and false cuscus (*Andropogon citratus*) given. Allusion was also made to the grass oils generally. Among the valueless drugs of recent introduction on the market a pink bark of an unknown species, consigned as red cinchona, was shown, together with the leaves of *Aloe spicata* sent from Natal; the partially exhausted bark of *Myroxylon Pereiræ*, catalogued as Balsam of Peru; a sample of tanne seeds, identified by Mr. Holmes as the fruits of *Camellia thea*; a species of *Agatnosma* described as "an unknown herb;" a specimen of the false cubebs, produced by *Piper crassipes*, which has lately appeared in the drug market; and mention made of the recent importation of a very fine sample of quilled cusparia bark under the name of cinchona; some extremely ingeniously prepared spurious beeswax, three samples of which were described as being "almost free from organic matter." Alstonia bark from *Alstonia scholaris*, official in the Indian Pharmacopœia, was shown; also specimens of fruits of *Amomum cardamomum*, the round cardamom, and of *Amomum villosum*, the hairy Chinese cardamon, both of recent introduction. The oleoresin of *Liquidambar styraciflua* was handed round and described as being well fitted for use instead of the impure oriental storax. Finally, attention was drawn to a specimen of essential oil of camphor, obtained as a dye product in the manufacture of camphor, which was stated to be a remedy of high value in rheumatism and chilblains.

A short discussion ensued, in which Messrs. Baily, Dodd and Winfrey, took part.

Votes of thanks to the essayists terminated the proceedings.

Obituary.

HERMANN KOLBE.

On Thursday, the 25th of November, Professor Dr. Kolbe, the eminent Professor of Chemistry in the University of Leipzig, died suddenly from heart disease. Had he lived only a few days longer he would have probably once more visited this country, it having been understood that he intended to attend the annual meeting of the Royal Society, on Monday last, and receive in person the Davy Medal, which had been awarded to him in recognition of his researches on the isomerism of alcohols. Some idea of the enormous advance made in the science of chemistry in recent years and the share Kolbe had in the onward movement may be gathered from the following particulars of his life and work, for which we are indebted mainly to an interesting notice in the *Chemiker Zeitung*.

Adolf Wilhelm Hermann Kolbe was the son of a clergyman, and was born at Elliehausen, near Gottingen, on the 27th of September, 1818. He attended the Gymnasium at Gottingen and there studied chemistry from 1838 to 1842 under Wöhler. In the latter year he became an assistant to Bunsen, with whom he remained till 1845, after which, in 1846, he became a fellow assistant with Frankland in Lyon Playfair's laboratory in the Museum of Economic Geology, London. In 1851 Kolbe was appointed to succeed Bunsen as ordinary professor of chemistry in the University of Marburg, from whence he was called in 1865 to succeed O. B. Kühn in the charge of the chemical laboratory in the University of Leipzig. Professor Kolbe was also a member of the state board of examiners for pharmacists.

Kolbe rendered most important services in the development of theoretical chemistry. His earliest communications appeared in Liebig's 'Annalen,' and treated upon the composition of fusel oil from grain, the action of chlorine upon carbon bisulphide and the discovery of trichlormethyldithionic acid and methyldithionic acid (1845). In a communication to the Chemical Society in 1847, respecting some experiments made by him in conjunction with Frankland upon the conversion of methylcyanide and ethylcyanide into acetic acid and propionic acid, the opinion was for the first time expressed that the fat acids, as well as benzoic acid, contained alcohol radicals, a theory that Kolbe afterwards followed up and proved to be correct. When subsequently Wurtz attempted to appropriate the credit of this discovery, Liebig defended in a most determined manner Kolbe's right of priority, and said of him, "all his work stands in harmonious relationship and is supported by theories which throw more light upon the origin of non-nitrogenous organic compounds than almost any other that we possess in organic chemistry." In 1847 Kolbe showed that the cyanogen compounds of alcohol radicals could be converted into acids containing more carbon than the alcohol from which they were prepared. Upon the basis of his theory that methy- was a constituent of acetic acid, he in 1848 described the cacodyl compounds as dimethyl compounds of arsenic. In the same year Kolbe and Frankland prepared methyl (dimethyl), and in 1849 Kolbe obtained it through the decomposition of acetic acid by the electric current. In 1850 he developed his views upon the binary radicals. Six years afterwards he showed that an acid could be converted into the corresponding aldehyd by means of chlorides and cyanides. In 1860 he put forward the view that certain compounds stand in the same relation to carbonic acid as others to sulphuric acid, and in the same year he foretold the natural connection between organic and inorganic compounds. Glycollic acid was recognized by him as oxyacetic acid and glycocoll as amidoacetic acid, and the constitution of lactic acid and the relation of the acid to alanine were rightly interpreted. Isathionic acid was ascertained to be oxyethylsulphonic acid and taurin amidoethylsulphonic acid. Further, by

the application of chemical principles Kolbe was able to predict the existence of secondary alcohols and to perceive the constitution of di- and tricarbonic acids. Frankland and Kolbe also must be looked upon as the originators of the theory of the saturation capacity of carbon, which has been more fruitful in the development of theoretical organic chemistry than any other. In addition Kolbe extended our knowledge of the acids of benzoic resin, the chemical constitution of asparagin and asparaginic acid, the isomeric relations of fumaric and maleinic acids, and of itaconic, citraconic and metaconic acids, as well as upon uric acid and many other compounds. The synthesis of salicylic acid, first effected by him, is an operation that has long passed from the laboratory to the manufactory.

As the chief representative of the older Berzelian views, Kolbe was the most decided and important opponent of the type and structure theories, with the advocates of which he maintained an unceasing literary warfare, which unfortunately too often exceeded the proper limits. As a consequence, Kolbe, although undoubtedly one of the foremost of German chemists, occupied an isolated position among his fellow-scientists. On the occasion of being elected a corresponding member of the Academy of Sciences at Berlin, he caused considerable surprise in scientific circles by sending back his diploma, with the message that he had become too old to correspond with the Academy upon scientific subjects. The Academy had been guilty of the mistake, immeasurable in Kolbe's eyes, of extending the initial "H." of his Christian name into, "Henricus" instead of "Hermannus."

Besides his numerous papers Kolbe, was the author of more than one manual of chemistry and other works. In 1869 he became the editor of the *Journal für praktische Chemie*, founded by Erdmann, in which work he was afterwards joined by Dr. E. von Meyer. Those who are familiar with this journal will know how frequently the polemical instincts of Kolbe became manifest in the numerous contributions from his pen.

Kolbe was an honorary doctor of medicine and surgery in the University of Tubingen, an honorary member of the Universities of Kasan and Kiew; also a privy councillor of the Kingdom of Saxony and the holder of various other honours.

Just previously to his death Kolbe had appeared to be specially vigorous and robust. On the day of his death he had been at work in his laboratory until five o'clock in the afternoon; he then went to a meeting, from which he returned about eight o'clock and dropped dead at his own door just as he had got out of his carriage.

Notice has also been received of the death of the following:—

On the 1st of November, Mr. Douglas Keall, Chemist and Druggist, Sittingbourne. Aged 38 years.

On the 1st November, Mr. James Frodsham Robinson, Chemist and Druggist, Frodsham. Aged 46 years.

On the 4th of November, Mr. Geo. Wm. Watt, Chemist and Druggist, Glasgow. Aged 33 years. Mr. Watt had been an Associate of the Pharmaceutical Society since 1873.

On the 10th of November, Mr. Thomas Barber, Chemist and Druggist, Salisbury. Aged 61 years.

On the 12th of November, Mr. Samuel Milward, Chemist and Druggist, Crown Terrace, Upper Holloway, London. Aged 45 years.

On the 15th of November, Mr. William Griffiths, Pharmaceutical Chemist, Swansea. Aged 64 years. Mr. Griffiths had been a Member of the Pharmaceutical Society since 1853.

On the 20th of November, Mr. Charles Hoad Wavell, Chemist and Druggist, Brighton. Aged 42 years.

On the 21st of November, Mr. James Capper, Chemist and Druggist, Chester. Aged 70 years.

On the 21st of November, Mr. Francis Brothers, Chemist and Drugigst, High Street, Ashford. Aged 77 years.

BOOKS RECEIVED.

SELECT EXTRA-TROPICAL PLANTS readily Eligible for Industrial Culture or Naturalization. By Baron FERD. VON MUELLER. American Edition, revised and enlarged. Detroit: G. L. Davis. 1884. From the Publisher.

INORGANIC CHEMISTRY. By EDWARD FRANKLAND Ph.D., D.C.L., LL.D., F.R.S., and FRANCIS R. JAPP, M.A., Ph.D., F.I.C. London: J. and A. Churchill. 1884. From the Publishers.

A COURSE OF QUALITATIVE CHEMICAL ANALYSIS. By the late WM. GEO. VALENTIN, F.C.S. Revised and Corrected by W. R. HODGKINSON, Ph.D., and H. M. CHAPMAN. Sixth Edition. London: J. and H. Churchill. 1884. From the Publishers.

ALL ABOUT OPIUM. Edited by H. H. SULTZBERGER. London. 1884.

DENTAL CARIES: a Critical Summary; and THE PREVENTION OF DENTAL CARIES. By HENRY SEWILL, M.R.C.S., L.D.S. London: Baillière, Tindall and Cox. 1884.

A TREATISE ON THE PRINCIPLES OF CHEMISTRY. By M. M. PATTISON MUIR, M.A., F.R.S.E., etc. Cambridge: University Press. 1884. From the Syndics of the Cambridge University Press.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

"SERPENTS' EGGS."

Sir,—I beg to enclose specimen of a toy sold to children by dealers in fireworks, and others in halfpenny boxes, as "Serpents' Eggs," containing four eggs, without any label or caution whatever. You will at once perceive how dangerous they are, being composed of about two grains sulphocyanide of mercury. I have called the attention of the public in the local press to their dangerous nature, being so easily mistaken for confectionary or coated pills.

Mirfield, Yorkshire. CHAS. CROOK.

Errata.—On p. 344, col. ii., line 25 from top, for "sp. am. arom., ℥iss" *read* "sp. am. arom., ℥iss." On p. 436, col. ii., line 10 from top, for "ray liver oil introduced by Mr. Henry Hay," *read* "ray liver oil introduced by Mr. Hay Henry."

Analysis of Bark.—Mr. A. C. Abraham wishes to point out that the contraction "mm." which occurs in his paper on this subject, printed on p. 433, is intended to indicate "minims," the convenience of which to a pharmacist will be obvious.

C. Johnson.—Ganot's 'Elementary Treatise on Physics,' translated and edited by Atkinson. (Longmans.)

J. L. Chaplin.—Johnson's 'How Crops Grow;' Warington's 'Chemistry of the Farm' (Bradburys.)

G. Roberts.—(1) Tinct. chloroformi co. (2) A fluid ounce to be taken when the pain is severe.

F. March.—Mix the last three ingredients in half the water and add two drachms of mucilage; dissolve the first ingredient in the remainder of the water and mix. The quinine thrown out of solution will be in so minute a state of division that it will remain suspended in the mixture.

W. E. M.—It is not necessary.

Nemo.—(1) Watts's 'Dictionary.' (2) We know of no work or pamphlet on the subject, the notices of the drug being usually limited to a few lines, as in 'Pharmacographia.'

E. Matthews.—The prescription is rather an unusual one, and the form used is uncommon. Probably the prescriber intended to leave the decision as to the kind of clay to be used to the judgment of the dispenser, who might be be supposed to be better informed upon the subject than himself.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Tanner, Ince, March, Ball, Maben, Ferrall, W. R. F.

I.H.E. 1884.

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See also—*British Medical Journal*, Nov. 13th, 1880; *Medical Times & Gazette*, Jan. 1st, 1881; *Medical Press*, Jan. 26th, 1881.

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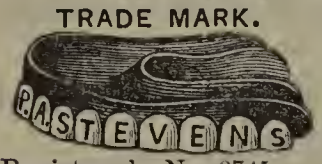

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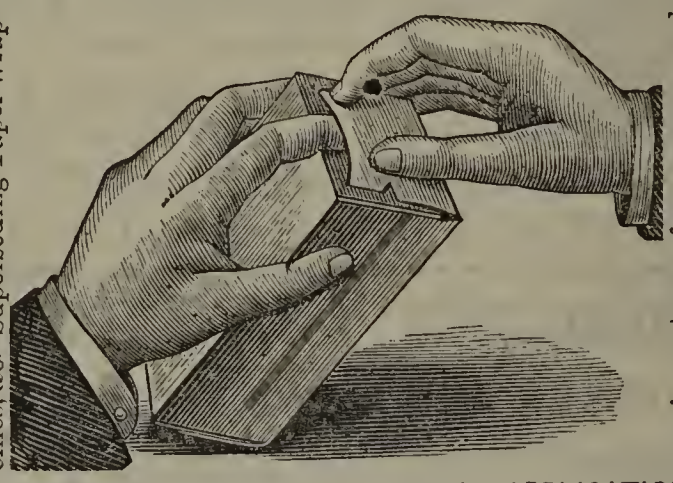

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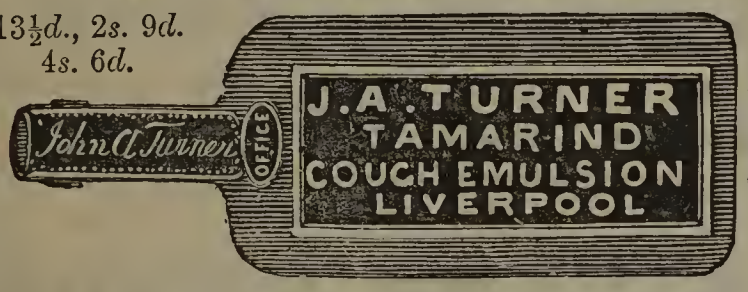

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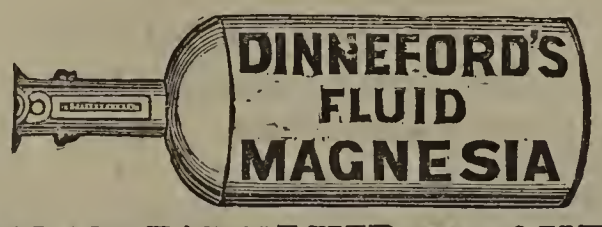

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CHEMIST'S Assistant or Surgeon's Dispenser. Married. 20 years' experience. Chemicus, 18, Mowbray St., Nottingham.

AS Bookkeeper or Town Traveller in Wholesale house. 10 years' experience. Excellent testimonials. Age 28. A. B. C., 5, Nunthorpe Rd., York.

AS Assistant, in London. In or out-door. Light Retail, with time for study. Age 23½. Abstainer. C. J., Church Cottage, Church St., Great Malvern.

TO Manage, with view to early purchase, a small good class business, or will accept any other place of trust. First-class references. Particulars, 68, Berridge Rd., Nottingham.

AS Assistant, thoroughly competent. Height 6ft. Age 28. Disengaged December 27th. E., 127, Buckingham Palace Rd., S.W.

AS Manager or out-door Assistant. Married. Age 32. Good Prescriber and Counterman. West-end experience. Permanency desired. Speaks French and German. Chemist, 24, Moreton Pl., Belgrave Rd.

AS Junior. 4 years' experience. Height 5ft. 8in. Passed Preliminary. Age 20. Zita, 30, Western Rd., Hove, Brighton.

ASSISTANTS WANTED.

IMMEDIATELY.—A surgeon, in a pleasant suburb of South London, requires a young man, 18 or 20 years of age, competent to Dispense. A small salary and plenty of time for study. Would not object to arrange with an Improver or Pupil. Address, A. B., 74, High Rd., Kilburn, London.

AN Assistant (out-door), able to take Management of Retail Counter. A thorough knowledge of good class country trade indispensable. R. Dresser Folkard & Co., Pavement, York.

IMMEDIATELY.—Competent and qualified Assistant, for Branch in N.W. district. 2 kept. Good Counterman and Dispenser. Single. Not under 25. One who has been accustomed to a Co-operative Drug Store preferred. Must have good references. Apply personally, otherwise full particulars to J. H. Lewis, 22, Great Portland St., W.

ASSISTANT, accustomed to good class Dispensing business. About 21 or 22 years of age. Applications containing full particulars, to Symes & Co., 14, Hardman St., Liverpool.

GOOD opportunity to an energetic Assistant. Age about 23. For general Retail (Branch), in centre of large town, South Coast; take sole charge if necessary. In or out-door. Abstainer preferred. Good references indispensable. State full particulars, with salary. Unanswered letters declined. Chemicus, Messrs. Herrings, 40, Aldersgate St., London.

A THOROUGHLY competent Senior, who has been used to first-class Dispensing business. Address letter with usual particulars, to T. Chase, Pharmaceutical Chemist, Five Ways, Edgbaston, Birmingham.

SENIOR Assistant by middle of December. Age 24 to 26. One with London experience preferred. Apply personally, or if by letter, state salary, in-door, required, &c., to Twinberrow & Son, 71, Westbourne Grove, W.

ACTIVE, obliging, and trustworthy Assistant, about 26, as Stockkeeper, and to assist at the Counter and Dispense when required. Salary to commence at 30s. per week, with no Sunday duty. A permanency for a trustworthy man. State full particulars, including age and references to last two employers, to Timothy White, Drug Stores, Portsmouth.

ASSISTANTS WANTED.

MIDDLE of January.—A gentlemanly young man, about 20 years of age, for a light Retail business. 3 afternoons and 3 entire evenings given for study each week. E. W., 120, Ferndale Rd., Clapham, London. S.W.

AN Assistant to Manage a Chemist's business in connection with Dentistry. One able to do Mechanical Dentistry preferred. Apply, stating age, salary required, and enclosing photo., to Cornus, care of Messrs. Evans, Son & Co., Liverpool.

AN accurate Dispenser, where no other Assistant is kept. Apply, stating salary, &c., by letter, or in person. All communications not answered in 3 days declined. Address Mr. Urwick, 60, St. George's Rd., Pimlico, London.

JUNIOR by the 20th inst. Sleep out. Board in. Will not be required Christmas and Boxing day. One who can Extract Teeth preferred. Field & Co., 157, High St., Borough, S.E.

CHELSEA.—Appointment of Dispenser.—The Guardians of the Poor will, on Wednesday, the 10th December next, elect a person to fill the office of Dispenser for the out-door and in-door Poor, at the several salaries of £70 and £50 a year, without other emoluments. He must be a Licentiate of the Apothecaries' Company or registered under the Pharmacy Act, and will be required to devote the whole of his time to his duties as Dispenser and to such other work connected with the Medical Department of the Workhouse and Infirmary as he may be called upon by the Guardians to perform. Applications, with copies of testimonials, must be sent to me, on or before Tuesday, the 9th December next, and Candidates must attend at the Board-room on the following day, at 12 o'clock. No travelling expenses allowed.

By order, Wm. Miller,
250, King's Rd., Chelsea, S.W., Clerk to the Guardians,
26th November, 1884.

A COMPETENT Assistant to conduct (single handed, under the direction of the principal) a light class business, doing £1250. Salary £100, increasing £25 annually to £200, then probably arrangement for succession. Preference given to an active hand used to a pushing trade. Applications to be considered declined if not replied to in 10 days. Full particulars to Dentist, Hodgkinsons & Co., 198, Upper Whitecross St., E.C.

IMPROVER or Junior. Must have a knowledge of Single Needle Telegraphy. A youth backward in Counter work and Dispensing would have every opportunity to improve himself in a good class Dispensing business. The principal would render him every assistance. Telegraph work nominal. Particulars and salary expected, to 33, Argyle St., Birkenhead.

JUNIOR Clerk, in the Counting House of a Wholesale Chemist and Druggist. Must be quick, industrious, and write a neat and legible hand. Sufficient knowledge of the nomenclature of the trade required, to be able to read and copy orders. Apply, by letter only, stating age, qualifications and salary required, to S. S., care of Messrs. Dawson & Sons, 121, Cannon St., London, E.C.

A COMPETENT Assistant, from 30 to 35, who has had good West-end experience. Apply to C. D., 13, Charles St., St. James's.

S. V. HOLGATE, 29, Long Row, Nottingham, will shortly have a vacancy for a qualified Senior, not under 25. Must be reliable, and accustomed to good class business.

A QUALIFIED Assistant, unmarried, in-door, with good experience, to conduct (single handed) under the direction of the proprietor, a Branch (first-class) in a fashionable town on South Coast. Apply, stating age, height, salary, references, &c., enclosing carte, to M. P. S., 114, Church Rd., West Brighton.

ASSISTANTS WANTED.

EARLY in January.—For a good class suburban business, where one only is kept, an Assistant, about 25, possessing the Minor qualification at least. One wishing for a permanency preferred. Applications not answered in 3 days may be considered declined. Pharmacist, care of Messrs. Barron, Harveys & Co., Giltspur St., E.C.

APPRENTICE.—E. J. Evans, Pharmaceutical Chemist, has a vacancy for a well educated youth. Time for study, and assistance freely given towards thoroughly learning the business. Triangle, Clevedon

A. J. MONK, Chemist and Druggist, Alton, Hants, will require, after Christmas, a well educated youth as an Apprentice.

A DISPENSER, age about 23, possessing Major qualification, immediately for a fashionable inland resort. In-door. 3 Assistants kept. Address, stating height, &c., salary required, and references, to W. H. A., care of Meggeson & Co., Miles Lane, London, E.C.

COMPETENT Assistant, not under 25. Apply, giving full particulars respecting age, qualifications, length and character of experience, names and addresses of last two employers (at least), and salary expected, to Clay & Abraham, 87, Bold St., Liverpool.

OUT-DOOR Assistant, speaking French. Must be competent and have West-end experience. Schouver, Chemist, Princes St., Hanover Sq., London.

ABOUT the 29th inst.—A qualified Assistant, to take charge of the Chemist Department, in a Mixed country business. In-door. Write, stating age, salary, with references, to Mrs. J. S. Hicks, East Looe, Cornwall.

EARLY in January.—A competent Assistant. Not under 23 years of age. In-doors. Of good address and experience. Must have good references to character and ability. One desiring a permanency preferred. Minor qualification essential. Apply personally, if possible, to Geo. Shepperley, Pharmaceutical Chemist, Market Pl., Nottingham.

A JUNIOR in a good class Retail and Dispensing business, where 2 are kept. Must be neat and accurate, and gentlemanly in manners and address. Apply, stating usual particulars, to Percy J. Smith, Chemist, Balham, S.W.

BUSINESSES FOR DISPOSAL.

A GOOD Retail, Dispensing and Prescribing Business, in a leading thoroughfare in a large and improving manufacturing town. Well fitted. Good shop, consulting room and house. Apply, W. Rosser, Official Receiver, Swansea. December 2nd, 1884.

A VERY old established Business, in the Midland Counties, to be disposed of by executors. Apply to Ventom, Bull & Cooper, 35, Old Jewry, London.

GLO'SHIRE.—In a market town. A good class Retail and Prescribing Business. Established over 60 years. Returning about £800. 4 years of lease unexpired. Only one other Chemist within 5 miles. Splendid opening for registered Dentist, none within 8 miles. Shop well fitted. Good stock, all new and best quality. Being thoroughly genuine, will bear closest investigation. Good house; side entrance. Garden. Price £700. Vendor, Messrs. Hearon, Squire & Francis, 5, Coleman St., London, E.C.

GENUINE good class Retail, Dispensing and Prescribing Business. Suitable for a single man. Full prices. Rapidly increasing suburb. Good and convenient house. Rent £40, which could be nearly let off. Price one year's returns. Satisfactory reasons for disposal. Apply, personally preferred, to W. Watts, Perry Hill, Catford, S.E.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for transfer:—Yorkshire (coast). Retail and Prescribing trade. Returning £1500. Very profitable. For £650 with house furniture, or £550 without, to effect immediate sale. Norfolk (coast). Retail and Dispensing trade. Returning £600. Oldest in town. For £500. Somerset. Retail and Prescribing. Returns £450. For £300. Large house and garden. Herts. Retail and Prescribing. Returns £450. For £325. Essex. Same hands 30 years. Through illness. Returns £550. For £400. Rare chance for Dentist. London, S.W. Double-fronted, well fitted, Retail and Prescribing trade. Returns £750. For £600. W. Corner Retail and Dispensing trade. Returns £700. N. Same hands 15 years. Taking larger trade. Returns £700. For £650. N.W. Corner. Well fitted. Greatly neglected. Returns £8 weekly. For £200, and part remain. Kilburn. Returns £5 weekly. Neglected. For £120. Apply, 30, Jewry St., Aldgate, City.

SOUTHAMPTON.—Situate in a first-class position in a leading thoroughfare, an established Business, which admits of very large extension. Present returns a little over £300 yearly. Rent very moderate. Price required about £275. Apply at Messrs. Orridge & Co.'s Offices, 32, Ludgate Hill, London, E.C.

HANDSOMELY fitted, well stocked Pharmacy, about 6 miles from London. Rent only £35. Two doctors' accounts cover the rent. Good house and small garden. Owner, leaving the trade, will take value of stock and fixtures. Also, another Pharmacy, in S.W. district. Address, Pharmacist, 12, Foubert's Pl., Regent St., W.

WEST End.—Returning £900, and rapidly growing. Very handsomely fitted and well stocked. Price £800. Half remain. Another. W.C. Very great bargain. Only £125. S.W. Returning £1100, at full prices. Only requires seeing to purchase. Apply to Mr. Hine Gilbert, 17, Hart St., Bloomsbury Sq.

SOUTH Wales.—An old established genuine Drug Business, with immediate possession. Through death. Fair receipts. Shop well fitted (mahogany). Good house and garden. A rare opportunity for anyone wanting a business in a good agricultural district. For further particulars apply to W. E., Victoria Pl., Crickhowell.

PARTNERSHIP. Country. Gentlemen wishing for the same may hear particulars of advertiser, who is about disposing of half of a profitable business, comprising 2 shops with good dwelling houses. Address, Partner 96, Messrs. Deacon's, Leadenhall St., London.

SURREY.—An old established and principally ready money Retail, Dispensing and Prescribing Business, about 20 miles from London. Returns for the last two years between £600 and £700; present year between £700 and £800. Shop has double plate-glass front, with mahogany fittings, and is well stocked. Nominal opposition. No Dentist in town. Long lease. Satisfactory reasons for disposal. Every investigation courted. Price for stock, fixtures, lease, goodwill, &c., £600. Tincture, care of Messrs. Barclay & Sons, 95, Farringdon St., E.C.

WANTED TO PURCHASE.

A GENUINE light Retail and Dispensing Business. London or country. Returns from £600 to £800. Address, with full particulars, which will be treated confidentially, to A. P. S., care of J. S. Heron, Solicitor, 27, Ely Pl., Holborn, E.C. No agents.

WANTED in each large town in the United Kingdom the leading Chemist to undertake sole agency for sale of the universally celebrated

BOND STREET CIGARETTES.

Applications to be made to Philip Morris & Co., 22, New Bond St., London, W.

GLOUCESTERSHIRE.

APPOINTMENT OF COUNTY ANALYST.

[Sale of Food and Drugs Act, 38 and 39 Vic., c. 63.]

NOTICE is hereby given that at the ensuing EPIPHANY QUARTER SESSIONS, to be holden at the Shirehall, Gloucester, on the 6th day of January, 1885, the Court will proceed to the ELECTION of an ANALYST of all Articles of Food and Drugs sold within the county of Gloucester, to be appointed under the provisions of the said Act.

It will be required of Persons offering themselves as Candidates for the Office that they shall possess competent knowledge, skill, and experience as such Analyst, and the Person selected will be required to reside within the county, or within the city of Bristol. In the performance of the duties of his office he will analyse and report without charge, and give evidence if required, on all articles sent to him by the Police under the said Act. A Salary or annual sum of £100, and £15 allowance for Chemicals, will be paid him. A Room at the Police Station at Cheltenham is provided as a Laboratory. He will be further required to analyse all articles or things unprovided for by statute which shall be sent to him, on a scale of charges to be submitted by him to the Court of Quarter Sessions, and to be approved by such Court.

Applications, with testimonials annexed, are to be sent to the Clerk of the Peace for this county before the 13th day of December next.

FRANCIS EDWARD GUISE,
Clerk of the Peace.

Shirehall, Gloucester, 21st November, 1884.

FOR SALE AT HALF COST.

TWO Water Beds, also a few surplus stock Sundries. Apply, Daily, 50, Oxford St., Southampton.

FOR SALE.

A FULL sized Water Bed, in excellent condition. Cost when new 7 guineas. Any offer will be considered. Address, J. K., Mr. Carpenter, Hill St., Upper Clapton.

FOR SALE—CHEAP.

A QUANTITY of Drugs, Chemicals, Druggists' Sundries, and Proprietary Articles, previous to stock taking. Write for list of surplus stock to Mason & Proctor, Wholesale Druggists, 3, Albion St., Leeds.

TO CHEMISTS.

FOR Sale.—The complete Fittings of a Chemist's shop, comprising one range of 66 second-hand Drawers, painted mahogany, new glass knobs and gold labels, and lockers under, shelving over, with pilasters and cornice; one 6ft. Counter, one 9ft. ditto; Window Enclosure, complete; Desk and Glass Case, Dispensing Screen, with mirror centre; one plate-glass Counter Case, 5ft. long; three 3 gallon Carboys, seventy-two 16 oz. N. M. Rounds, labelled; twenty-four 20 oz. W. M. ditto, twenty-four 8 oz. ditto, twelve 3 lb. white Jars, labelled, twelve 6 oz. ditto. A bargain, £37.

Twenty-four 1 gallon black Carboys, 40s.

Twenty-four 60 oz. blue Syrup Bottles, with plugs, 40s.

Twelve 1 pt. turquoise Syrup Bottles, 16s.

Twenty-four 3 lb. white Shop Jars, labelled, 40s.

Twenty 6 lb. ditto ditto, second-hand, 24s.

Twelve second-hand 4 lb. drab Jars, 20s.

Twenty-four 2 lb. blue Jars, labelled, 40s.

One second-hand upright Show Case, as Maw's fig. A 56, plate-glass in doors, no tablet, 47s. 6d.

One new Tooth Brush Case, as Maw's fig. A 9, 37s. 6d.

One large new Dispensing Screen, with handsome tablet in centre, total length 7ft., £7.

One 12ft. range of 66 new mahogany-fronted Drawers, with glass labels and knobs, price £8 5s.

New Shelving and Cornice over, 40s.

Richard Tomlinson, Midland Fitting Warehouse, 15, St. Paul's Sq., Birmingham.

Midland Counties' Transfer Agency.

F. J. BRETT,

Trade Valuer and Auctioneer,

LEICESTER.

Valuations.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Purchasers have, at this agency, the advantage of about **300** Businesses to select from, requiring from £100 to £3000 capital.

Probate and Fire Insurance valuations.

LONDON, N.W.—Dispensing and good class Retail, returning £550, well fitted shop, good house, low rent, price £400.

Midlands.—Country Retail, short hours, returns £1500, net profit £300, price £900.

Warwickshire.—Exceptionally profitable Retail, returns over £500, and capable of considerable increase, age and ill-health necessitate sale, price £500, or as arranged.

Worcestershire.—Village Retail, with Dispensing and good Prescribing, returns £500, rent £20, price £320.

Liverpool.—Family Trade and Dispensing, in excellent position, returns average £800, an excellent chance, price £500.

Homœopathic.—Leicester. Death vacancy, net profit £100, only one other homœopathic chemist to 150,000, a smart business man would treble returns, price £120, rent free to Christmas.

Yorkshire.—£1700 returns, general Retail, with Wines and Spirits and Ale agency, situated in a picturesque village, at valuation, £900.

Nottingham.—Family Retail and Dispensing, recently opened, doing £4 week and will sure to double soon, satisfactory reason for sale; also general Retail, returns about £500, for £250.

London, W.—Dispensing and light Retail, doing £6 week, and increasing, for £200.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. Brett, Leicester.

VIZER'S

CHEMISTS' TRANSFER and ASSISTANTS' REGISTRATION AGENCY,

Victoria Chambers, 55, Chancery Lane, London.

Gentlemen desiring to dispose of businesses without undue publicity may depend on special precautions to that end. Early particulars should be sent.

Purchasers applying for businesses should specify locality preferred and capital to be invested.

ASSISTANTS' REGISTRATION DEPARTMENT.

An Employer writes: "*Mr. ——— wishes to thank you for your prompt attention to his application.*"

An Assistant writes: "*The situation seems to be quite suitable to me, and I feel much indebted to you.*"

Employers and Assistants should send full particulars of requirements, with Registration Fee, 2/6, *Postal Order.*

SPLENDID INVESTMENT.

FOR immediate disposal.—Eight first Mortgage Debenture Bonds of £25 each, bearing 10 per cent. per annum interest. Address, Executrix, Messrs. Deacon's, Leadenhall Street, London.

CHEMISTS' TRANSFERS.

32, Ludgate Hill, London.

MESSRS. ORRIDGE & CO., Chemists' Transfer Agents, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. Orridge & Co. has been known as a Transfer Agency in the advertising columns of the Pharmaceutical Journal since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business, will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer :—

1. London, W.—Good class. Returns £430. Price £400.
2. London, N.W.—Returns over £500. Price £450. Half can remain.
3. London, N.—Returns £300. Price £250. Or offer.
4. London, N. „ £760. „ £700.
5. London, N. „ £826. „ £750.
6. South Coast. „ £500. „ £450.
7. Middlesex. „ nearly £600. Price £450.
8. Norfolk. „ £1200. Valuation.
9. Wilts. „ £600. Price £550.
10. Dorset.—Unopposed. Returns £1350. Valuation.
11. North of England.—Returns nearly £4000. Price about £3500.
12. Lancashire.—Returns £1200. Valuation.

Messrs. O. & Co. have a large number of good businesses on their register for disposal, requiring the investments from £150 to £4000. Purchasers wishing to enter business at commencement of the year are requested to communicate at once, when full particulars of suitable investments will be forwarded without delay.

VALUATIONS.

Terms for valuation on application.

Appointments for December should be made early.

ORRIDGE & CO.

32, Ludgate Hill, E.C.

INSTRUCTION IN PILL COATING

GIVEN BY

N. ALLSWORTH, Pharmaceutical Chemist,

147, CITY ROAD, E.C.

ONE Lesson of half-hour sufficient to enable any one to Coat Pills of a pearly lustre, white and uniform, equal to any of the wholesale makers.

No special apparatus required.

Terms, including recipe, 10s. 6d.

Samples and particulars forwarded on receipt of stamped envelope.

MAW'S
EARTHENWARE INHALERS
For Hot Water, Infusions, &c.

ELASTIC TUBE.

FIG. 13.

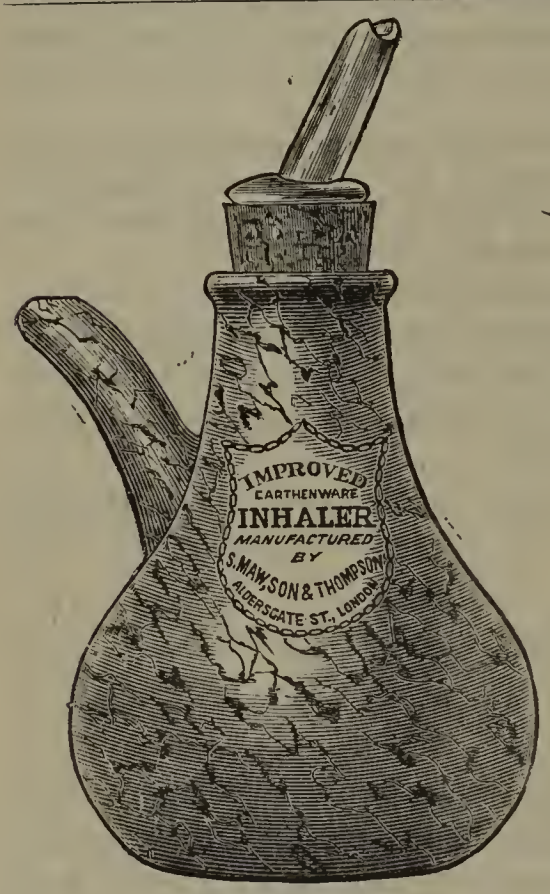

FIG. 8.

MAW'S IMPROVED.

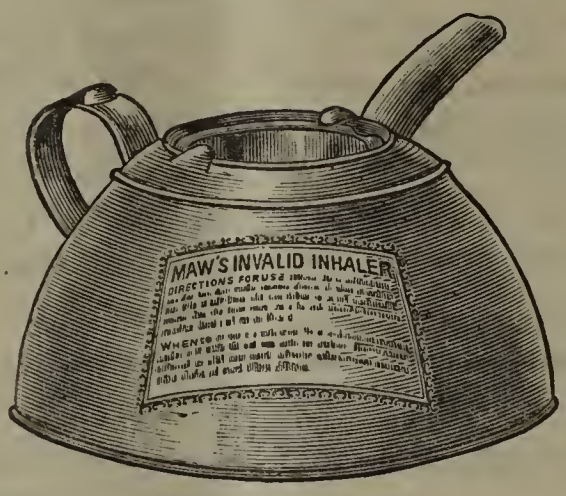

FIG. 100.

MAW'S INVALID.

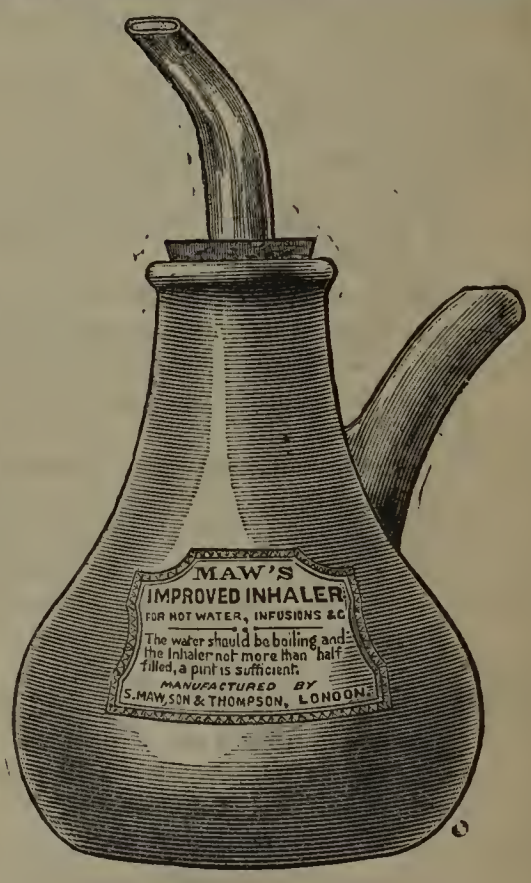

FIG. 8A.

MAW'S IMPROVED.

Fig. 8:—Marbled, 32s. per dozen.

Fig. 100:—White, 33s.; Gilt Lines, 39s. per doz.

This Pattern is specially adapted for use in bed.

Fig. 8a:—White, 21s. per doz.; Retail, 2s. 6d. each.

ELASTIC TUBES, as Fig. 13, will fit any of the above.

7 inches long, including Mouth-pieces ... ... 8s. per dozen.

9 inches long, including Mouth-pieces ... ... 12s. per dozen.

MANUFACTURED BY

S. MAW, SON & THOMPSON
LONDON.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 755.] SATURDAY, DECEMBER 13, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
Condensed Milk. By Thomas Maben..	461
Red Bark. By Robert Cross	463
A Simple Form of Apparatus for Estimating Urea. By A. W. Gerrard ..	464
Cocaine. By Dr. Squibb	465
The Essential Oil Industry in Grasse. By F. A. Flückiger	468
Decomposition of Optically Inactive Compounds. By E. Jungfleisch....	470
EDITORIAL ARTICLES AND NOTES:—	
The Local Government Board and the Sale of Food and Drugs Act ..	471
The Recent Explosion while Preparing Coloured Fire	472
Notes:—Revised Medical Scale for Passenger Ships — Votes wanted for an Orphan Asylum—Deaths by Poisoning in Scotland—An Unexpected Electric Shock—Lectures on Organic Chemistry—Notices ..	472
PHARMACEUTICAL SOCIETY OF IRELAND:—	
Meeting of the Council	473
PROVINCIAL TRANSACTIONS:—	
Liverpool Chemists' Association:—	
The Estimation of Morphia in Opium. By Michael Conroy....	473
Edinburgh Chemists' Assistants and Apprentices' Association:—	
The Study of Materia Medica. By J. R. Hill	476
Hawick Pharmaceutical and Chemical Association	478
PROCEEDINGS OF SCIENTIFIC SOCIETIES:—	
Chemical Society	478
Society of Arts:—	
The Preparation of Butterine	479
CORRESPONDENCE:—	
The Benevolent Fund	480
Liquid Extract of Cinchona	480

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

LIBRARY AND MUSEUM.

SPECIAL NOTICE.

The Library and Museum will be closed from 2 p.m. on Wednesday, December 24th until 9 a.m. on Monday, December 29th; and will not be open in the Evening from Monday, December 29th to Thursday, January 1st, both dates inclusive.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

LIBRARY.

The following books are missing from the Library:—

Attfield's Chemistry, 9th ed., 1881.

Hardwich's Manual of Photographic Chemistry, 9th ed., 1883.

Martindale and Wescott's Extra Pharmacopœia, 3rd ed., 1884.

Members, Associates, and Apprentices are invited to examine their Libraries, and if any of the above-mentioned works be found therein, to forward such work or works to the Librarian of the Society.

INDEX TO ADVERTISEMENTS.

		Page
ÆSCULAP BITTER WATER CO. (Ld.)		4
ALLEN & HANBURYS	Malted Farinaceous Food and Pharmaceutical Preparations	13
ALLSWORTH, N.	Instructions in Pill Coating	23
APOLLINARIS CO. (Ld.)	Hunyadi Janos	14
ASSISTANTS WANTED		20, 21
BEDDARD, J.	Belgravia Tooth Paste	17
BENNETT, C.	L.D.S. Diploma	22
BETTS & CO. (Ld.)	Metallic Capsules, &c.	8
BOLE HALL MILL CO.	Surgical Bandage	17
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BOWLES & CROSS	Printers	4
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And it was further ordered that the Defendant do pay the costs of the said action.

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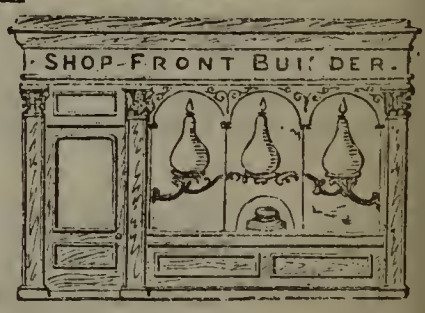

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CONDENSED MILK.*

BY THOMAS MABEN.

Condensed milk occupies an important position in the dietetics of the age, and though its introduction, at least in the forms in which we are now accustomed to it, is, comparatively speaking, somewhat recent, the industry has already assumed enormous proportions. The modern method of condensing milk was originated by an American about thirty-five years ago, though it was some ten years later before it came to be considered a practical success. But the idea of preserving milk by concentration was by no means new, as, according to Marco Polo, the Chinese Tartars were, so far back as the thirteenth century, in the habit of preparing a condensed milk, which differed from that now in use chiefly in this, that the fat was made use of for butter, while the preserved milk consisted simply of dried casein, milk sugar and mineral matter.

The processes for preparing condensed milk have been greatly improved upon of late years, and the methods given by some writers are probably now quite antiquated. The following epitome of the process as described, in 1872, by Mr. Willard, of Cornell University, New York, may be of some interest:—"The milk when received at the factory is first passed through a strainer to the receiving vat; from this it is conducted off, going through another strainer into the heating cans, each holding about 20 gallons; these cans are set in hot water and the milk is held in them till it reaches a temperature of 150° to 175° F.; it then goes through another strainer into a large vat, at the bottom of which is a coil of copper pipe, through which steam is conducted, and here the milk is heated up to the boiling point. Then the best quality of white granulated sugar is added, in the proportion of $1\frac{1}{4}$ pounds of sugar to the gallon of milk, when it is drawn into the vacuum pan, having a capacity of condensing 3000 quarts or more at a time. The milk remains in the vacuum pan, subjected to steam, for about three hours, during which time about 75 per cent. of its bulk in water is removed, when it is drawn off into cans holding 40 quarts each. The cans are only partially filled and are then set in a large vat containing cold water, the water being of a height equal to that of the milk in the cans. Here it is stirred until the temperature of the condensed fluid is reduced to a little below 70°; it is then turned into large drawing cans with faucets, in order to facilitate the filling of the small cans, holding 1 pound each, which are then immediately soldered to exclude the air."

If this represents the actual process as now carried on, it effectually disposes of the allegation so frequently made, that a portion of the cream is taken from the milk before condensation. Of all the condensed milks I have examined there is only one in which there was the slightest ground for the suspicion that a portion of the cream had been abstracted, and, generally speaking, I believe that condensed milks are perfectly reliable so far as the relative proportions of cream and casein are concerned.

Condensed milk is also sent into the market without any added sugar. One practical difference between the sweetened and unsweetened milk is that the former keeps good almost indefinitely after the tin has been opened, whereas the latter must be used up immediately, otherwise it is certain to go bad.

Having during the past year had considerable experience with the use of condensed milk as infant's food, I have been at some trouble to go carefully into the whole question, and as I am not aware that any comparative statements have ever hitherto been attempted, save on the most superficial bases, I am not unwilling to put my results into a somewhat permanent form.

In the first place I was naturally anxious to secure the best milk, and for that purpose I—with the assistance of Mr. Dechan, without whose constant presence in the laboratory it would have been quite impossible for me to have overtaken the work—undertook the analysis of a number of the best brands in the market, both sweetened and unsweetened, representing Swiss, English, Irish, Canadian and Norwegian manufacture. As the results of our work in this direction may be of some interest, I here insert them in tabular form, omitting, for obvious reasons, the name of each brand. They are classified in what seems to me the order of excellence, that order depending on the combined weight of the casein and fat. The milk sugar is calculated from the quantity of casein present. These—the milk sugar and casein—usually occur in the proportion of about 4·0 to 4·5, but as it is probable that some of the latter is lost in the process of condensation, I allow 5 parts of milk sugar for every 4 parts of casein. A mean has been taken in each case, of two or three, and in some instances six analyses.

COMPOSITION OF VARIOUS BRANDS OF CONDENSED MILK.

Sweetened.

	Casein.	Fat.	Milk sugar.	Cane sugar.	Salts.	Water.	Sp. gr. of 20p.c. solution.
A .	11·5	10·5	14·4	34·5	1·6	27·5	1048·7
B .	11·8	9·6	14·7	33·8	1·8	28·3	1044·4
C .	12·12	9·0	15·2	34·4	2·03	27·25	1048·4
D .	12·0	8·0	15·0	32·9	1·9	30·2	1048·4
E .	11·3	8·6	14·0	36·0	1·6	28·5	1049·2
F .	11·5	8·2	14·4	35·0	1·4	29·5	1048·5
G .	12·0	6·7	15·0	36·0	1·5	28·8	1050·0

Unsweetened.

	Casein.	Fat.	Milk sugar.	Salts.	Water.	Specific gravity.
H . .	11·0	10·5	12·5	2·0	64·0	1098·0
I. . .	9·0	8·25	15·75	2·0	65·0	1097·4
K . .	8·2	8·3	13·0	1·6	68·9	1081·9

From the first we had been using milk E., but we subsequently adopted one of the other milks, and have had no reason to regret having made the change.

Of the unsweetened milks, the only one that I can regard as really containing no added sugar is that marked H.

The process adopted in the analysis was substantially that given in a paper on "Milk Analysis," by Mr. Dechan and myself, which was published in the *Analyst* for last October. The only difficulty exists in the drying in order to ascertain the percentage of moisture; the large proportion of sugar renders it very difficult to drive off the water, and as a con-

* Read at a meeting of the Hawick Pharmaceutical and Chemical Association, December 2.

sequence the process from first to last is exceedingly tedious.

There has always been considerable difference of opinion regarding the use of condensed milk as a food for infants, and many medical men are strongly opposed to its employment, especially in the sweetened condition. The question has frequently been discussed, and some months ago an interchange of medical opinion again took place in the columns of the *British Medical Journal*. To one of the letters that therein appeared (June 28, 1884, p. 1285), viz., that of Dr. O. Davies I shall presently refer in some detail. Acting on the suggestions contained in these communications I was induced to consider the advisability of giving up sweetened condensed milk altogether in favour of the unsweetened; but on going into the question I found that unless milk sugar were used to bring up the carbohydrates to the normal of mother's milk there would be no advantage, while in any case a great amount of extra labour would be entailed. Moreover the question of expense, though probably in the circumstances not of so much consequence to me, would weigh very considerably with many heads of families, who would probably think twice before spending 1*s.* per day on unsweetened milk and milk sugar, or 9*d.* if cane sugar were used, when at the utmost 4½*d.* per day would amply suffice for the cost of the sweetened milk.

Before a proper comparison can be instituted between the different substitutes for mother's milk and that milk itself, it is absolutely necessary to have some idea of the relative quantities of solid nourishment contained in each of these, and I propose, therefore, to give the results of my calculations in the direction of at least an approximately correct series of figures.

In the letter to which reference has already been made, Dr. Davies states that "it is estimated that a healthy woman gives three pints of milk in twenty-four hours." He does not say, and I have no means of knowing, whether this is simply the estimated average, but we may assume that it is so. It is extremely difficult to fix the composition of woman's milk, since not only the quantity but the quality of the milk depends on such a variety of circumstances that no two women will give milk of the same composition. Very variable results have been obtained by different analysts, and in order to be as fair as possible, I have taken the mean of four analyses, from which I find that woman's milk may be represented as containing milk solids in the following percentage:—Casein, 2·63; fat, 3·0; milk-sugar, 5·7; and saline matter, ·2. From these figures we can readily calculate the amount of solids in three pints of milk.

There is no difficulty in finding the percentage of solids in diluted condensed milk, but there is considerable difficulty in knowing to what extent condensed milk ought to be diluted. The Anglo-Swiss label recommends that for infants the milk should be diluted with from 7 to 14 parts of water; the Aventicum says 7 to 10, the Scandinavian 10 to 15 and so on, the idea being that the milk should be used weaker at first and gradually increased in strength. According to Dr. Davies there is no evidence to show that a woman's milk is stronger at six months than it is at one month after parturition, and consequently he prefers to use milk of a uniform strength all though. After some tentative experiments we decided to dilute the sweetened condensed milk in the proportion of 1 to 11 of water, and that strength has been adhered to from first to last with excellent results. I have noted the quantity of milk used each day, the average being as nearly as possible, eight tins in thirteen days for each child, and from this we calculate the solid nourishment taken every twenty-four hours. As a general rule, nurses give the milk very much stronger than 1 to 11. I know of no instance in the circle of my personal acquaintance where so weak a milk is given, but I do know of several where children of six months were allowed as much as a tin a day. At this rate we need hardly wonder if medical men have sometimes had cause to find fault with its use.

The main purpose of Dr. Davies's letter was to condemn sweetened, or at least to recommend unsweetened condensed milk. His words are:—"With regard to condensed milk, the 'First Swiss Brand,' that is the unsweetened milk (the only kind that should be used), is four times as strong as the ordinary milk from the cow, therefore a tin would be equivalent to a quart of milk. A tin a day is about what should be given, diluted with five times its bulk of water." As each tin contains about 11 ounces we can readily find the proportion of solids for each twenty-four hours, where this quantity of milk is used. (The notion that condensed milk equals four times its bulk of cow's milk is very common, but also very erroneous. Neither the First Swiss Brand nor any other brand that I have met with contains anything like this strength. It is nearer the mark to say "three times as strong" and some brands are not even so strong as that.)

Again, some medical men strongly recommend milk from one cow, or mixed cow's milk, either of its natural strength or diluted in different proportions with water. There is the same difficulty in getting at a reliable standard for the composition of cow's milk as in woman's milk, but the variations in the analyses of the former are not so marked. I have taken the mean of the results obtained by four eminent chemists, and this gives the composition of the solids of cow's milk as follows:—Casein, 4·68; fat, 3·75; milk sugar 4·26; and salts, ·62; per cent. From these figures I get the quantity of milk solids as in case of the other milks.

The following table expresses the estimated quantities, in ounces, of the various milk solids taken by an average child in twenty-four hours, when fed on mother's milk, condensed milk, cow's milk, and mixtures of cow's milk and water.

	Mother's milk. 3 pints.	Sweetened condensed milk (A). 3¾ pints.	Unsweetened condensed milk (H). 3¾ pints.	Pure cow's milk. 3 pints.	2 parts cow's milk, 1 part water. 3 pints.	Equal parts cow's milk and water. 3 pints.	1 part cow's milk and 2 parts water. 3 pints.
Casein . . .	1·57	1·12	1·22	2·8	1·87	1·4	·93
Fat	1·8	1·04	1·15	2·25	1·5	1·12	·75
Milk sugar . .	3·42	1·41	1·37	2·55	1·7	1·27	·85
Mineral matter	·12	·15	·22	·37	·24	·18	·12
Cane sugar . .		3·39					
Total solids .	6·91	7·11	3·96	7·97	5·31	3·97	2·65

It is hardly necessary for me to analyse this table;

each one who has an interest in the question can do this for himself and draw his own conclusions. It is very evident, however, that as they stand the milk that comes nearest the mother's milk in the total amount of solids is the sweetened condensed milk. The milk that approximates most nearly in the quantities of casein and fat is the mixture of two parts cow's milk and one part water; but this is of course deficient in the saccharine principle, and requires the addition of either milk sugar or cane sugar to the extent of one and a half ounces per day. The deficiency of casein and fat in the diluted condensed milk could be got over by making the milk stronger, that is, by adding less water, but this increases the quantity of cane sugar also, which is undoubtedly not desirable. As compared with mother's milk even the best of these substitutes is no better than an approximation, but there are several reasons why condensed milk should have the preference over ordinary cow's milk.

Objection is frequently taken to the use of sweetened condensed milk, and from various standpoints. For example, we are told that the excess of cane sugar decomposes and forms lactic acid which gives rise to irritation and diarrhœa; but this may readily be obviated by a more or less liberal allowance of lime water, this being particularly necessary during teething time, when the natural tendency is for acid secretions to be formed. We are further assured that ossification is retarded by the use of this milk. The following sentences are quoted as an example of a common line of argument, from a work intended as a text-book for students, and published so lately as this year. The author says:—"Condensed milk cannot be regarded as a model food in the same way as pure milk, for the proportions of heat-giving and nitrogenous matters are too high. Children fed upon it fatten rapidly, but, owing to the comparatively small quantity of saline matter present, the bones are only imperfectly formed. Generally a weak state is produced and a predisposition to disease." With reference to these statements, it is obvious from the tables I have given that the nitrogenous matter is not too high; on the contrary, it is rather low; and that the saline matter is not present in "comparatively small quantity," but, as compared with human milk, in large quantity. The idea expressed in the last sentence is also very common, but I would be glad to see the statistics on which it is based. I find that medical men themselves can rarely point to a single case among the hundreds that pass through their hands, and say "that child has been injured by the use of condensed milk." My own observation leads me to believe that children fed on condensed milk are quite as healthy and as able to resist disease as those fed on ordinary cow's milk, and while I am not at all inclined to regard the former as a perfect food I prefer it to the latter, even when that is mixed so as to be brought to the nearest possible approximation to human milk, for several reasons.

Condensed milk is more digestible than ordinary cow's milk, a fact which is admitted even by those who say it should not be used. It is less liable to turn sour in the bottle, and how great a boon this is is known only to those who have to do with feeding-bottles. It is less liable to decompose in the stomach. A medical friend informs me that he frequently finds that children fed on cow's milk are troubled with flatulency, diarrhœa, green-stools, and want of health generally, and that on changing the food to condensed milk these symptoms at once disappear and a most healthy condition of body is induced. Condensed milk is less liable to vary in composition and more likely to be pure. It is well known that the quality of cow's milk varies with the food supplied to the cow, and as in these days it is often the main object to have quantity, quality is frequently at a discount. Besides this, the change of a cow, the introduction of a new cow into the dairy, the use of milk before it is quite free from the colostrum, all these have often been accompanied with dangerous results. Now this cannot happen with condensed milk. It is in the interests of the dairymen themselves to use the very richest milk for condensing purposes; the cows are fed on Nature's food, whether in the green Swiss valleys or the Norwegian dals, or "in the pastures of the far-famed Acadia of Longfellow's 'Evangeline,'" as one advertisement sets forth in poetic language; and if due care is taken to mix and properly condense and preserve the milk, the chances of variation or impurity are indeed few and far between.

The conclusion, therefore, to which I arrive is that when mother's milk is not available, a good sweetened condensed milk is the best substitute, and, though it is not by any means a model food, it is not quite so unsatisfactory as some authorities would have us believe.

P.S.—Since the above was in type, I notice in the *Chemical News*, for December 5, the first instalment of a very complete paper by Professor Albert Leeds, on "The Composition and Methods of Analysis of Human Milk." So far as it has gone this valuable communication contains nothing that affects the tables I have drawn up. The percentage of ash in the sample with which Professor Leeds experimented was 0·21, which very nearly corresponds with what I have given as the mean of four analyses, viz. 0·2, and the other figures as stated above may also be accepted as giving an equally reliable average.

RED BARK.

BY ROBERT CROSS.

A little over two years ago, after arrival on the Nilgiri hills, in Madras, with a collection of cinchona plants—for which I was sent by the India Office to South America—I called attention to the mistake which had been committed in planting at Naduvatum and other places on the hills a comparatively useless cinchona, the Huanuco bark of Peru, for the true "red bark" of Chimborazo, *Cinchona succirubra*, plants of which were dug up by myself on the slopes of that mountain and brought direct to India twenty years previously. To those who thought I might be mistaken in my assertions I may say that after having dressed and transplanted the original stock of "red bark" plants *twice* in their native forest, I would just as likely be liable to mistake my own handwriting.

At the time of the introduction of the cinchonas into India it so happened that the Huanuco and "red barks" reached the Nilgiris about the same time, were propagated in the same hothouse and so had become indiscriminately mixed up together. In this way the "red bark" was lost sight of and was mistaken for the Huanuco species, which it resembled in the form and colour of the leaves,

especially when forced in a hothouse. As the plantations grew up a sprinkling of "red bark" trees were found thinly dispersed therein. Had the two sorts been kept carefully separate the loss experienced by planters and others would have been avoided. An examination of the cinchona blue books will show that it never was intended to cultivate the Huanuco bark to any extent.

In India, as in South America, two distinct varieties of "red bark" are observed. One of these, which possesses smooth foliage, is called by South American collectors *Pata* bark; while to the other, the leaves of which are hairy underneath, the term *teja* or "tile" bark is applied. These sorts are not kept separate in commerce. The *Pata* sort, however, seems to inhabit a rather higher zone on the mountain slope, and so may prove hardier than the other. Probably both varieties are of equal merit as quinine producing plants.

Before leaving India I collected a little bark of both sorts for purposes of comparison, together with a few samples of "crown" bark. Most of the samples were taken from renewed trees, the aim being to secure as near as possible bark of each sort of the same age. Yet it will be understood that even among trees of similar size one tree from any particular circumstance may develop slightly thicker bark in the same space of time than another which may be growing under more modified conditions. The trees selected were growing at the same general elevation. The special objects in view were:—

1st. To compare the yield of the *Pata* with the "tile" bark.

2nd. To place these two sorts against "crown."

3rd. To observe the increase of alkaloid which takes place as the bark grows older.

To the obliging kindness of David Howard, Esq., F.C.S., I am entirely indebted for the examination of the samples, a copy of which is annexed.

I beg to direct attention to the small proportion of the inferior alkaloids contained in the bark when compared with the yield of quinine. It seems to me that when really good sorts of trees are properly cultivated and carefully managed a steady yield of the best alkaloids may be relied on. It would, I think, be important to ascertain the highest *sustained* yield of quinine that any or all of the best species can attain to. On this, in my opinion, rests the future prosperity of planters wherever bark trees are cultivated.

No.	Analysis of Samples referred to by D Howard, Esq., F.C.S.	Quinine Sulphate= per cent.	Quinine Alkaloid per cent.	Cinchonine Alkaloid per cent.	Cinchonidine Alkaloid per cent.	Quinidine Alkaloid per cent.
1	True "red bark," *C. succirubra*, *Teja*, or "tile" variety of South American bark collectors, one year old renewed bark.	5·32=	4·00	1·42	0 66	0·14
2	True "red bark," *C. succirubra*, "tile" variety, two years old renewed bark.	4·40=	3·30	trace	0·23	0·06
3	True "red bark," *C. succirubra*, *Pata* variety, one year old renewed bark.	5·68=	4·26	trace	0·08	0·08
4	True "red bark," *C. succirubra*, *Pata* variety, two years old renewed bark.	5·82=	4·37	trace	0·32	0·17
5	"Crown," one year old renewed bark.	2·60=	1·95	trace	trace	0·18
6	"Crown," two years old renewed bark.	3·10=	2·33	0·17	0·06	0·17
7	"Crown," three years old renewed bark.	7·64=	5·23	0·38	0·48	0·66
8	"Crown," four years old renewed bark.	8·80=	6·60	trace	0·12	0·37
9	"Crown," apparently original bark. Tree twelve years old.	12·30=	9·22	0·00	0·12	0·64
10	Root bark from large primary roots of true *C. succirubra*, *Pata* tree, twenty feet high.	4·68=	3·51	2·10	2·26	0·77
11	"Crown," a variety with small leaves, the *Paramo* bark of Loxa collectors, three years old renewed bark.	6·28=	4·69	1·03	0·48	0·34

A SIMPLE FORM OF APPARATUS FOR ESTIMATING UREA.

BY A. W. GERRARD, F.C.S.,

Pharmaceutical Chemist.

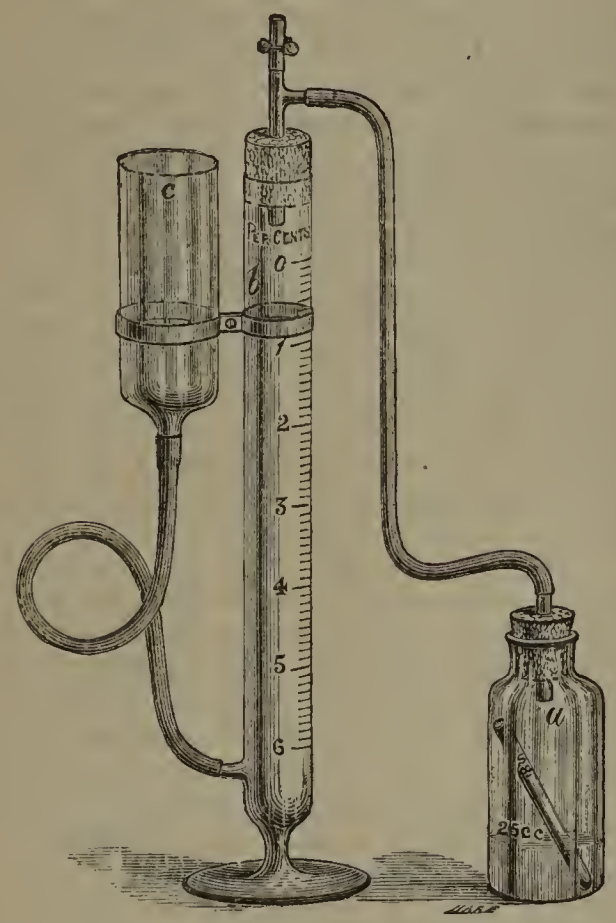
By estimating the amount of urea in a urine the physician or surgeon obtains valuable information as to the condition of a patient, and this work is now being carried out on an extensive scale in many of the medical schools of the metropolis.

Hitherto the instruments employed have chiefly been those of Dupré, and of Russel and West; these, whilst leaving nothing to be desired as regards accuracy, appeared capable of simplification. The present communication is the result of an effort in that direction.

The bottle *a* of the illustration contains a test tube graduated to 5 c.c.; it is connected with *b* by means of caoutchouc corks and tubing; *b* is further connected by caoutchouc tubing with a glass vessel *c*. The two glass vessels *b*, *c* are held together by a sliding spring clamp allowing *c* to be moved freely up or down.

Method of using the Apparatus.—The glass vessels *b*, *c*

are filled with water to the zero line; then inside the bottle *a* is placed 25 c.c. of a solution of hypobromite of soda, and inside this bottle a test-tube, as seen in the illustration, containing 5 c.c. of the urine to be examined. Fix the caoutchouc corks securely so that no air can enter at any of the joints, and see that the water is at zero; if not, open the small pinchcock at top of *b* and the water will at once return to zero, then close the pinchcock. Take the bottle *a* in the hand and incline it so that



the urine upsets into the hypobromite; effervescence at once follows and the evolved nitrogen forces the water from the glass vessel *b* into the glass *c*. The end of the reaction is known by a cessation of effervescence; then the bottle *a* is placed into cold water to reduce the expansion caused by the heat of the reaction. When all is cool, as seen by the steadiness of the water, the tube *c* is lowered by means of the sliding clamp until the levels of the waters are equal, thus balancing pressure.

The operation is now finished, and the figure at which the water rests in *b* is read, and represents per cents. of urea. The instrument is graduated in tenths, so that if the water stood two lines below 3 the quantity of urea shown would be 3·2 per cent.

To prepare the hypobromite of soda, 100 grams of caustic soda is dissolved in 250 c.c. of water, and to 23 c.c. of this solution 2·2 c.c. of bromine is added, giving the exact quantity for the analysis of 5 c.c. of urine.

To avoid the unpleasantness occasioned by escape of bromine vapours, it is customary to use the bromine in sealed glass tubes; one of these containing 2·2 c.c. is placed in a strong bottle with 23 c.c. of the above caustic soda solution, a sharp shake breaks the tube and the hypobromite is ready and bad smell avoided.

In addition to the above use of the instrument, it may be employed, when graduated in c.c., for the estimation of carbonates, using, to avoid solution of the CO_2, a saturated brine instead of water.

COCAINE.*

BY DR. SQUIBB.

Cocaine and its salts have always been very expensive and rather rare in the market,—have always come from abroad, and, so far as the writer knows, Merck, of Darmstadt, has been the principal maker. A very few houses in this neighbourhood had each a small quantity of, probably, not exceeding a few grams, and this small supply was rapidly exhausted. Some buyers were shrewd enough and quick enough to get a few grams and hold them for the advanced prices which they foresaw, and such have now, for some time past, been the only sources whence any could be had. Orders to Merck, and perhaps to other makers, were cabled as soon as the excitement commenced, but up to this time, Nov. 19, only two or three small parcels are known to have been received in the United States, and it therefore seems quite probable that the demand abroad has also been greater than the present means of supply. The hydrochlorate of cocaine, which is the salt so much in demand, is put up by Merck in vials of 1 gram each, and these before the excitement were sold at wholesale at 2·50 dollars each, or about 16 cents a grain. But the price did not remain long at this figure; it rapidly advanced to about 8·00 dollars per gram, or over 50 cents per grain before the main supply was exhausted—and the latest prices heard of were 75 cents per grain, or 1·25 dollar per fluid drachm for a 4 per cent. solution. The orders sent out have been numerous, and for quantities likely to be overwhelming for an article hitherto so little used. A single New York house ordered 2000 grams, and had one customer ready to take the whole. Many of these orders are overdue but not heard from, except the two or three small lots above mentioned, and these have come in at increased prices, with notice of still farther advances. Two large houses in the United States are advertising a 4 per cent. solution of their own make, and are said to be selling the solution—the one at 7·00 dollars per ounce, the other at 6·00. The salt of Merck's make, which was sold in the United States at 2·50 per gram, probably cost the importers about 2 dollars, including the 40 per cent. duty, so that Merck's prices must be somewhere about 1·40 dollars per gram.

It is exceedingly rare that a novelty in the materia medica is so easily and so quickly tried, and still more rare that one is found that is so very definite and so very important in its results, and the future utility of which is so quickly and so easily established, and hence the importance of a prompt supply of the substance if possible. The great probability that only small quantities of so rare and costly an alkaloid would be either on hand, or in process of making in Europe, and that the demand there would exhaust that, and keep it exhausted for some time to come, leaving but little available for the United States, while the demand would be much greater in the United States than in Europe—induced the writer to try to bridge over the difficulty temporarily, by trying to learn how to make it in small quantities for further investigation of its uses. It was fully recognized that, like many other similar articles, it cannot be made permanently in the United States because of the enormous tax there on alcohol and ether, these appearing to be the chief solvents used in making it, unless some cheaper solvents can be found for its extraction and purification. Another difficulty to be met was that of getting good coca leaves to make it from. In assaying coca leaves the best results the writer has ever obtained were about ·26 per cent. of cocaine, and this is in accordance with other published assays, while upon a manufacturing scale the best results published seem to have been about ·2 per cent. of the hydrochlorate, or 2 grams per kilogram, and this for the best leaves. Now as good coca leaves are rarely to be had in the United States or elsewhere, in quantity, at less than 1·00 dollar per pound, and often 1·25 dollar, and as a pound yields at most not over 14 grains of the salt of the alkaloid to those who have learned how to make it, it follows that the salt when still in the leaves is worth (1·00 ÷ 14 =) 7 cents per grain or 1·09 dollars per gram. As the learning how to get it out is costly, and the solvents, apparatus

* From *Ephemeris*, November, 1884.

labour, etc., also costly, there cannot be a large profit on it even in Germany at 1·40 dollar per gram, and it is therefore much better for the users of it in the United States to buy it abroad where it can be made so much cheaper. Nevertheless it seems just now worth while to try to temporarily supply a small quantity, and as the solution would be much more easily made than the solid salt, to aim only at that, and at a strength of 4 per cent. Two lots, only, of fair coca were found in the market at 1·00 dollar and 1·25 dollar per pound, and only one of these at 1·00 dollar was in sufficient quantity. The leaves were green and fresh-looking with fair odour and taste, but appeared to have been gathered and dried when small and young. They were well put up in compact bales of about 100 pounds each, and looked not only much better but much fresher than any seen in the market for two years past. A preliminary qualitative testing showed the presence of cocaine in them, and they were ground to a fine powder, losing about 4 per cent. in drying and powdering, bringing the net cost up to 1·14 dollar or more per pound.

Upon this powder all the published processes accessible to the writer were one after the other tried, and also some original processes, and some combinations of those of the books, occupying about a month in time and over 100 pounds of powder, with almost negative results. Some processes yielded no alkaloid at all, others only traces, while others gave a few grains which had to be used up in the testings to ascertain their identity. By this time it was suspected that the powder could hardly contain much alkaloid, although in appearance it had been of fair quality,—good enough to warrant its use in the hurry for alkaloid, without taking the time for a quantitative assay. Such an assay, which should have been made at the beginning, was then made at the end of such a loss of time and material, and showed, by the assay process previously given (see *Phar. Journ.*, Aug. 23, p. 146), that the powder contained about ·18 per cent., or less than two-thirds of what it should contain, and this assay showed that the process given is not well adapted to poor quality of coca, so that a better assay process had to be sought. Four other samples of coca were obtained from the market, costing 65 cents., 55 cents., 50 cents and 40 cents. per pound. On the analogy of tea and coffee it was supposed that the lower grades might possibly yield nearly as much alkaloid as the higher; but this did not hold good in the United States, as some of these lower grades appeared to contain no alkaloid at all, while others contained too little to work with any advantage by so expensive a process or processes. So it became necessary to adhere to the young, green coca as the best that could be had.

Of all the processes thus far tried, none have been at all satisfactory, and others are still being sought out, but that of W. Lossen, of 1862, as given in Gmelin's 'Handbook,' English edition, vol. xvi., p. 300, seemed to be the best thus far, when modified in some of the details. Up to this time, however (November 19), nothing like the proper amount has been obtained from the coca, and the small return for so much expense and labour is so discouraging that if a reasonable supply from abroad could be reasonably expected within a short time, it would be abandoned.

As it is, however, the writer still hopes to produce it when better coca can be obtained, and thinks there may possibly be cheaper solvents found for it than alcohol, ether or chloroform. Where such large quantities of a substance have to be exhausted for so small a result as 8 to 12 grains to the pound, and the alkaloid so sensitive and so easily decomposed, there is no wonder that it requires great skill to prevent its being lost in the large amount of extractive matter. Something like an alkaloid is always obtained by all the processes, but it often proves to contain very little or no cocaine.

Merck's hydrochlorate of cocaine came in the form of a damp, amorphous, granular powder of a rather dusky white colour,—several shades off from being colourless. It has a peculiar ethereal odour, and a mildly bitter taste, the taste being very promptly succeeded by a benumbing sensation. It is soluble in strong alcohol, but not appreciably soluble in strong ether. A gram of the salt gives 387·5 grains, or a little more than seven fluid drachms of 4 per cent. solution. This solution is opalescent or turbid, and requires filtering, leaving several milligrams of insoluble matter on the filter, and the filtrate is not colourless, but of a greenish-yellow tint, and neutral or slightly alkaline reaction. Of this solution 10 c.c. equal to ·4 gram of the salt precipitated with solution of carbonate of sodium 1 in 5, gave a white precipitate of the alkaloid cocaine, which, dried at a low temperature, weighed almost exactly ·3 gram, or three-fourths the weight of the salt taken. It should yield, according to Gmelin (vol. xvi., p. 302), 88·78 per cent. The precipitated alkaloid is very sensitive to heat, turning brown when dried on a porcelain surface hardly above 70° C. Authorities state that when precipitated by carbonate of sodium it is not soluble in an excess of the precipitant. This may be true, but yet a considerable proportion of the alkaloid can be washed out, by ether, from the mother-liquor from which the alkaloid has been precipitated by a slight excess of carbonate of sodium. If the carbonate of sodium does not dissolve it, the chloride of sodium, which results from the decomposition of the hydrochlorate of cocaine, does. In the precipitation with carbonate of sodium no carbonic acid is given off. The alkaloid when pure or nearly so is but slightly soluble in water, but it is quite soluble in water which holds even small proportions of the extractive matters and the salts of the coca leaves. It is easily washed out of alkaline watery solutions, provided there be but little extractive matter or alkali present—either by chloroform or ether; but with the substances just mentioned present in any considerable proportion, an emulsion is formed with both solvents that no device yet tried has been able to separate, although much time and pains have been given to the matter.

The solution of Merck's hydrochlorate in distilled water, and the solution filtered, remains entirely clear for two or three weeks, but some that is now a month old shows the usual signs of microscopic growths. But a solution made at the same time, wherein half the water was replaced by a cold saturated solution of salicylic acid, remains entirely clear and bright, and, judging by analogy and experience with the salts of other alkaloids, it will remain clear indefinitely. The solution so protected has been frequently used without discoverable irritation, and from these circumstances it follows that all solutions of salts of cocaine should be so protected from change.

From what has been said it appears that a 4 per cent. solution of Merck's hydrochlorate contains only about 3 per cent. of the alkaloid, or 3·41 per cent. of the hydrochlorate of the alkaloid, and yet this solution appears to be quite strong enough for all ordinary uses to which it has been applied up to the present time. Many ophthalmologists appear to have succeeded well with a 2 per cent. solution, but they do not mention the quantities of this solution used, and it is inferred, from some experience communicated by Dr. C. S. Bull, that the quantities used must have been larger than he used, and if by this there was any loss of solution by overflow, or much loss of time in waiting for the anæsthesia, and especially if the anæsthesia was not complete, then there is no economy in the smaller cost of a 2 per cent. solution. From all the experience up to the present time it seems probable that a 4 per cent. solution is the best, and the only one needed, as it appears to be strong enough to produce complete anæsthesia with quantities so small as not to involve waste by overflow, or unnecessary loss of time. Abundant experience has shown that in all ordinary cases of eye operations the instillation of two drops into eye, and, after waiting two minutes, three drop

more, will in ten minutes after the second instillation, give an anæsthesia which will continue complete for about ten minutes, and pass off in about twenty minutes, leaving no irritation or other bad effects. Doubtless weaker solutions will be required for therapeutic purposes, but these can be easily made extemporaneously from the stronger one. Use has been made of both a 2 per cent. and 1 per cent. solution in painful conditions of the eye with entire relief, but the applications have to be frequently renewed, as the effects pass away rather rapidly. Such solutions are of course very easily made from a 4 per cent. solution as needed, without any necessity for keeping more than the one stock solution.

The effects of cocaine as a local anæsthetic are wonderful, and it is still more wonderful that these effects should not have been before discovered. There have been several independent investigations of its physiological and therapeutic effects. It has often been dropped in the eye, and its mydriatic effect was well known. It had also been used for spraying the fauces in laryngology to lessen the sensitiveness to the use of instruments, and its discoverer, Niemann, and many since have noticed its benumbing effects upon the tongue; but it remained for Koller to discover its effects as a local anæsthetic, and thus within a week's time to raise it from an obscure position in the list of useless alkaloids to an importance and utility hardly exceeded in the materia medica. It had been repeatedly given both internally and hypodermically, and found to require large doses, often repeated, to produce any appreciable effect. One grain of it will give complete anæsthesia of an eye for ten or fifteen minutes, fifty times, and yet the same quantity taken into the stomach has hardly given an appreciable effect, and this quantity represents about 400 grains of good coca. Thus there seems to be very little relation discoverable at present between its general effect on the economy and its local effect. As an agent correctly and properly classed with tea, coffee, guarana, etc., as a nervous stimulant it was so indefinite in effect—at least when of poor quality—as to lead some close observers to doubt or deny its stimulant action, when now it suddenly comes into view in the opposite role of the most powerful nervous sedative ever known short of absolute destruction of tissue. The action of heat, or of chemical cauteries which destroy the tissues, do not more completely obliterate sensation than this agent, and yet it does not appear to interfere with vitality at all, does not irritate at all either primarily or secondarily, and its profound action appears to be followed by no hurtful reaction. With such a character so suddenly acquired, it seems practically to have sprung into existence fully armed for a great amount of future good in the art of medicine. Already it has been applied to many purposes beside those of ophthalmology, and extravagant and improbable statements in regard to its effects are circulated, and it has also, doubtless, been often misapplied, but it is far too well tried to be classed with the doubtful novelties of the time, or have an uncertain importance in the future. The difficulty now is to get it for application.

One of the most interesting points in connection with it is, as to what becomes of it in action. Unlike atropine and other alkaloids its effects are very transient. Is it as easily and as rapidly decomposed into inert substances in action as it appears to be in the process of extraction from the leaves? Or is it simply diluted as it is absorbed into the circulating fluids, and simply ceases to act from dilution?

Another curious point is its differing activity upon different persons. A piece of paper $\frac{1}{4}$ of an inch square, wetted with a 4 per cent. solution and laid upon the tongue, will give a pretty distinct sensation of the size and even the form of the insensitive or numb spot within one minute on some persons, while in others it will take twice and three times that length of time, and give a more faint impression, while in one case met with it gave no impression at all. Bibulous paper wetted with the solution and dried may be carried in the pocket, certainly for some days, and probably for an indefinite period, and when cut and laid upon the moist tongue will promptly produce the characteristic effect.

The agent, for reasons given above, must always be an expensive one unless it should be made synthetically, as is not improbable,—but the expense, for many uses at least, is not so great as appears at first sight. Take its use in eye surgery as a good example. For any ordinary eye operation 2 fluid ounces of ether or more are required for an anæsthesia, costing not less than 10 cents at the least. Five minims of the 4 per cent. solution of the cocaine salt gives the required local anæsthesia at a cost, after the present excitement passes, of not over 5 or 6 cents, while the time and skill required in the two applications are pretty nearly equalized. But in the one case the whole organism has to be anæsthetized for an operation of a few minutes upon a single small part, while in the other case only the part itself is rendered anæsthetic. Should the demand for salts of cocaine remain greater than the supply, and very few people be able to get good coca, or learn how to make the salts, as is not improbable for some months at least, holding the price still up to, say, 1·00 dollar per fluid drachm for the 4 per cent. solution, this would give about 1·67 cent per minim, or 8·33 cents for a single anæsthesia for the eye, and a proportionate cost for other uses.

The opportunities for an extensive use of the agent are very numerous and important. Its principal effects so far have been for the most part upon mucous membranes, or upon surfaces denuded of cuticle, and it is not known how far it will affect unbroken skin or the tissues beneath. Some superficial neuralgias are said to have been benefited by the application of the solution, and upon this the writer has suggested the use of the paper wetted with the solution and then dried—the paper to be cut of the size of the superficial pain—to be wetted and applied to the part, and then to be covered with oiled silk a little larger than the paper. The results of such applications have not yet been heard from.

A far better preparation for such uses would be, however, an oleate of cocaine. The alkaloid unites directly with oleic acid and forms a true salt, and this salt is a principal object the writer has in view if he should finally succeed in making the alkaloid. The facility with which these oleates are absorbed by sound skin, and the depth to which they probably penetrate before being too much diluted by the circulating fluids, give, theoretically, great promise for the use of such a preparation for the relief of local pain.

In short there can hardly be imagined a larger field of usefulness than is now open for investigation by means of this new agent, and although there will be many disappointments and very much over-zealous enthusiasm, it is fortunate that but little harm can be done with it beyond the waste of so scarce and valuable a substance, as there has been no case yet reported in which any poisonous or bad effects have resulted from its use even when internally administered in grain doses.

The close relationship, if not identity, in physiological effects and popular usage of coca with tea and coffee, as a nervous stimulant, has led to the rational inference that caffeine might also prove to be a sedative or anæsthetic like cocaine, and some trials of caffeine have been published as unsatisfactory. But all the trials published, as well as those heard of from private sources, have not been so conducted as to be conclusive. When compared as they exist in coca and in tea, cocaine is about eight times stronger than caffeine, and therefore it might be expected that a 32 per cent. solution of caffeine would be required to do what a 4 per cent. solution of cocaine would do, and such a solution is at present impracticable. Besides, it is reported that solutions of caffeine are irritant to the eye.

THE ESSENTIAL OIL INDUSTRY IN GRASSE.*

BY F. A. FLUCKIGER.

The world-wide fame of Grasse depends upon the essential oils of plants which there grow wild or are cultivated. Among the former may be named:—(1) *Lavandula Spica*, Chaix (*L. latifolia*, Villars), the "aspic" of the French, which occurs plentifully in the country all around Grasse, and even quite close to the city. (2) *Lavandula vera*, DC. (*L. officinalis*, Chaix, *L. angustifolia*, Moench), which not only grows together with *L. latifolia*, but more frequently on high ground in the mountain region; generally *L. vera* is a much more widely spread plant thoroughout the Mediterranean region, and is also easily cultivated throughout Europe. Both these plants have stout woody stems, which are very enduring; those of thyme are still more vigorous. 3) *Thymus vulgaris*, L., a real ornament of the Mediterranean region, where it is found plentifully both in the Grasse district,—not making its way so high up the montains, but growing in the light thickets,—and on unsheltered coast. (4) *Rosmarinus officinalis*, L., the erect but always bent stems of which, reaching a height of two metres, and often several centimetres thick, probably overtop most other labiates, or, at any rate, are not equalled in any other European species of this family. At Mentone and Nice it is difficult to say whether *Thymus vulgaris* or *Rosmarinus* grows most abundantly. At Grasse the latter manifestly loses ground, notwithstanding that it is by far more conspicuous than the lower lying thyme. Here and there *Cuscuta* (*Epithymum*?) selects the rosemary stalks for its home.

The oils of these four labiates constitute an important export industry of Grasse. The plants being vigorous, persistent bushes, they require no cultivation, as the tops, bearing leaves and flowers, taken for distillation, are always replaced, even though the collector does his work in a most unskilful manner. The large distilleries in Grasse conclude arrangements with the communities in the districts round about, by which they become entitled to the produce of large tracts of land. The work itself is done for the Grasse firms by the rural population, who set up their simple copper stills on the spot and only carry the distillate to the city. Many of these travelling stills (*alambics voyageants*) are indeed the property of the large houses in Grasse. Probably the work has long been carried on this way. The Parisian druggist Pierre Pomet, who was well informed in such subjects, said in 1694, in his 'Historie Générale des Drogues,' concerning *Lavandula Spica*, "elle est si commune dans le Languedoc et en Provence . . . qu'elle ne coûte qu'à prendre," and he drew from this country the essential oils in question. That the oils are obtained in the manner indicated very cheaply is very probable, but it is a question whether a systematic cultivation and an economical manufacture would not induce greater progress. According to estimates for which the author is indebted to the kindness of M. Roure, proprietor of one of the largest manufactories, the following quantities of each oil are delivered in Grasse every year: from *Lavandula vera*, 80,000 to 100,000 kilograms; from *Thymus vulgaris*, 40,000; from *Lavandula Spica*, 20,000 to 25,000; from rosemary an equal quantity. The quantity sent out from Grasse probably covers the requirements of the whole world; at least the author only knows of rosemary that it is cultivated also in Dalmatia, which country sends about 20,000 kilos of the essential oil into the market.

Oil of thyme furnished the first materials, in 1847 and 1853, for the investigation of thymol, but this substance is no longer prepared from it. The amount of thymol in the oil appears to vary considerably, and more exact information on this point is desirable.

Of the oils which, unlike those already mentioned, are regularly distilled in the laboratories of the Grasse manufactories, those of species of *Citrus* must be named, and especially oil of neroli. The flowers of the bigarade tree (*Citrus vulgaris*, Risso) are not submitted to distillation for the oil, of which they yield at most one part from one thousand parts, but for the production of the thousands of hectolitres of "eau de fleurs d'oranger," "aqua florum aurantii," and "aqua naphæ," upon which Grasse prides itself; the oil of neroli is a bye-product, though of course very costly. According to the author's informants, about 2000 kilograms of this beautiful oil is prepared in Grasse yearly, but nominally much more is exported. When a proper price is paid a pure oil of neroli may be obtained; but the perfumers and druggists require it at reduced prices. In order therefore to accommodate them the producers add some "essence de petit grain," which however is no longer distilled from "petit grain," *i.e.*, the small unripe fruit of the bigarade tree, but from its leaves. No other species or form, however, of the genus *Citrus* is endowed with so fine an aroma in the leaves as the bitter-fruited orange tree, the "bigaradier." The blossoms of the ordinary sweet-fruited orange, which are not used for distillation, yield only an oil of inferior value. In competition with the products of the bigaradier, the sweet orange which is cultivated in Grasse is disappearing. Neither the bergamot nor the lemon occur there.

At the time of the author's visit the enormous metal tanks and cemented cisterns for holding rose water in the factory of M. Roure were ready for the reception of the products of the coming season, which, like that of the neroli flowers, is at its height in the month of May, when thousands of kilograms of rose leaves are passed daily into the stills. The rose oil collected in small quantity during the distillation of the rose water is probably equally as fine as the oil of roses from the Balkans or from India; but notwithstanding it grows in nearly the same geographical latitude, the rose in Provence produces far more of the worthless solid constitutent, dissolved in the liquid portion, which alone is odorous. The question arises whether a change in the strain of the roses so largely cultivated in Grasse might not lead to an improvement in respect to the oil. However, the rose water has for a century found a good sale, so that Grasse is not under the necessity to seek for further progress. The oil at present obtained in the manufacture amounts to about one kilogram from each 12,000 kilograms of fresh rose leaves; to completely satisfy the requirements of customers oil is obtained from the Balkans. The author thinks that the manufacture in Grasse affords a favourable opportunity to determine the chemical properties, hitherto completely unknown, of the oil to which the rose owes its perfume.

In perfumery "beurre d'iris" justly enjoys great popularity. It is distinguished above many other perfumes by an agreeable softness and great permanence. With the help of the most perfect methods of distillation iris root yields scarcely one part per thousand of the so-called "orris-root camphor." The above-named house in Grasse prepares four to ten kilograms yearly. Probably an equal quantity is distilled in London and in Leipzig. A specimen of orris butter presented by M. Roure to the author enabled him to make a comparison of it with preparations from the two other sources.* In the case of orris butter also we have to do with an oil, entirely uninvestigated as to its composition, occurring in minute quantity together with the odourless principal constituent, in this case myristic acid. In Grasse "beurre d'iris" is valued at 1500 to 1800 francs the kilo. It is noteworthy that the local manufacturers draw their supplies of raw material from Florence and Verona, whilst there cannot be the remotest doubt that *Iris germanica* and other species of *Iris* flourish equally as well on the mountains and hills of Basse-Provence as in the fields of Tuscany or at Verona. In this case, however, also there is no necessity to

* Abstract from a paper in the *Archiv der Pharmacie*, xxii., 473.

* See Fluckiger's 'Pharmacognosie,' p. 314.

give up the old custom, which is indeed carried so far that in no case is the *Iris germanica*, abundant in the district, made use of.

Besides the wholesale distillation of orange flowers and roses, some other aromatic plants are occasionally worked up when required, though not to any very great extent. But another source of considerable revenue is the manufacture of "pommades" and "extracts." In this extensive branch of industry the essential oil is utilized from flowers containing it only in very small quantity. Among these are (1) the bigarade orange flowers, and (2) roses. In the following the essential oil is present in so minute a quantity that it is scarcely practicable to obtain it by distillation.

(3). *Cassie.*—This is the name given by the French to the elegant yellow flower-heads of the *Acacia Farnesiana*, Willd., a small tree which first reached the Farnese gardens at Rome from the West Indies and Central America. The fine odour of the flowers brought about its introduction into Provence, which it appears did not take place, at least for industrial purposes, until 1825.* At present "cassie" is cultivated very carefully and on a large scale throughout the entire district between Cannes and Grasse. The plantations are usually the property of the manufacturers or other landed proprietors and are worked by lessees, the terms being the simple and primitive arrangement of sharing the proceeds with the proprietors. This system extends in this country to other perfumery plants, as well as to the olive.

(4). *Jasmin.*—The fields near Grasse are generally planted with *Jasminum officinale*, L., which was probably first brought to Italy from Asia Minor or India in the sixteenth century; but it is found advantageous to graft upon it the *Jasminum grandiflorum*, L., bearing larger flowers, having a more powerful odour; this also is an Indian species, which probably came to Europe before the time of Rheede, in whose 'Hortus Malabaricus' (v., tab. 52) it is figured. But the *Jasminum grandiflorum*, here known as "Jasmin d'Espagne," even in the beautiful Paradise of Provence, requires some shelter in winter, and this is effected by simply covering the small bushes with earth. Since only the flowers are required, the plants are allowed to grow scarcely half a metre high, and they are planted close to one another in regular rows. In the spring the young shoots are cut back. The flowering takes place in August. Professor Fluckiger suggests that an enterprising cultivator might make experiments at Grasse with the *Jasminum Sambac*, Vahl, which in India is far more highly prized and appears to possess a perfume far more powerful than that of any other species of jasmine, as was pointed out two hundred years ago by Rumphius A figure of *Jasminum Sambac* is given in the *Botanical Magazine*, vol. xliii. (1816), No. 1785.

(5). *The jonquille* (*Narcissus Jonquilla*, L.), probably of oriental origin, bears two to five extremely odorous yellow flowers, with a short funnel-shaped perianth and a corona four times as long. The name of the species (Italian, *giunchiglia*) is derived from the nearly cylindrical leaves, grooved on their upper side, recalling those of species of *Juncus*. When the author was in Grasse, in April, the flowering of the jonquil was already over.

(6). *Réséda* (*Reseda odorata*), cultivated throughout Central Europe as a favourite garden and pot plant; it is alleged to have been derived from Egypt.

(7). *Tubéreuse* (*Polianthes tuberosa*, L.) an Amaryllidaceous plant, belonging to the Agave division, and a native of Mexico. Its beautiful white flowers give its name to the genus (*polios*, white or grey); the single species has a short tuberculous thickened rhizome. The Polianthes was introduced in Europe during last century as an ornamental plant on account of its noble head of odorous flowers, which probably are nowhere else cultivated in such quantity as at Grasse. Already, between 1571 and 1577 it had attracted the attention of the Spanish physician Francisco Hernandez, who undertook the scientific exploration of Mexico at the cost of King Philip. In his "Nova Plantarum, Animalium et Mineralium Mexicanorum Historia' (Rome, 1651, p. 27), the indefatigable physician gives a modest but unmistakable figure, with a corresponding description of the beautiful plant, under the name "Omizochitl, seu Flos osseus." He also mentions its use in making odorous wreaths. Upon this point the scanty notice which Clusius gives in 1601 of the "hyacinthus indicus tuberosa radice" in the 'Rariorum Plantarum Historia' is silent. Clusius' figure is not so faithful as the one previously mentioned. Since the time of Clusius the name tuberose has clung to the plant.

(8). *Violette.*—The *Viola odorata* is not grown in the open field, like the other perfumery plants, but in the olive groves, which here extend over hill and valley in special beauty. The Riviera can show far larger and wider spreading olive trees, but those in the neighbourhood of Grasse are remarkable for their fresher and greener foliage. Besides this, the ground shaded by the trees is there richly overgrown with grass, so that the colour of the landscape recalls the loveliness of the hills near Florence. With such surroundings, the violet plantations spread out here and there, both in the immediate neighbourhood of Grasse and on the higher slopes, present a charming appearance. Occasionally the *Sarothamnus* is associated with it also. At the time of the author's visit he saw at the factory a large sack of the last violets of the season, which had been delivered fresh by the collectors only an hour before. The flower was the ordinary *Viola odorata*, neither darker nor brighter in colour, nor possessing a stronger perfume. But he was told that "les dernières de la saison" had a decidedly weaker odour, and he heard also that the collectors were dissuaded from bringing any more.

A great part of the industry and trade of Grasse is dependent upon the foregoing eight plants and it does not suffer from fluctuations due to change of fashion like many other industries. Year after year the manufacturers supply to their customers the same favourite "pommades" and "extraits," and it is noteworthy that no perfumer from the large centres of fashion should direct his attention to other preparations of the kind. The explanation may be that the introduction of novelties into this domain requires an acquaintance with the vegetable kingdom which is scarcely possessed by the purchasers of the pommades and extracts of Grasse.

The "pommades" are prepared by two methods, "infusion" and "enfleurage." In the former the transfer of the odorous principles to fat is brought about by intimate contact and warming. The predilection of the human family for unguents may not be easy to explain, but probably it goes back to the highest antiquity. Pliny ascribes their discovery to the Persians, and Pliny, Dioscorides, and other old writers refer in great detail to these preparations. In the present day pharmacy seeks not so much to convey to fat the agreeable odour of flowers as the healing properties of particular plants.

Dioscorides gives quite a detailed introduction to the purification of the fat for the purpose, and the preparation of this basis of pommades in the best condition is still the first endeavour of the manufacturers in Grasse. The best pig's lard or beef suet is selected, a considerable portion being contributed by the populous towns of the Riviera, as well as Lombardy. The melting of the fat, its mechanical purification and washing, are conducted with exemplary care and cleanliness. The digestion of fat with benzoin has long been carried on in Grasse on the

* "Apportées en France vers l'année, 1825" (Guib., Hist. Dr., iii. (1869), 396. Ricord-Madiana, as well as Bonastre, attempted in 1830 and 1831 the chemical investigation of the flowers of the West Indian *Acacia Farnesiana*, though without any result worth montioning (*Journ. Pharm.*, xvi., 571; xvii., 419). In the East Indies a gum exuding from the stem of the plant is collected. The root-bark is said to have a very strong garlic-like odour; it therefore probably contains an allyl compound. (Fluckiger, *Pharm. Chemie*, 1879, p. 65.)

largest scale, furnishing an incontestable opportunity of demonstrating its effectiveness; and the fact that the stability of fat is essentially increased by the process admits of no doubt. Lard and beef tallow, either separate or mixed in the proportion of 2:1, are kept until required for use in tinned iron vats, in fine dry ventilated cellars. The "infusion" is effected in large jacketted boilers, in which the fat is warmed by steam heat, and the flowers are added. In the month of May over 10,000 kilograms of rose or bigarade flowers pass daily, for many days in succession, into the boilers of the factory of Roure-Bertrand fils alone, and this is only a part of the daily consumption in the factories in Grasse. The diligent stirring of the flowers in the fat-bath is carried on by female workers, the expression by means of hydraulic presses is done by men. After the clearing of the fat by deposition and straining the finished pommade is at once weighed off in tin boxes or passes into the large subterranean storerooms, in which it will remain very good until at least the next season.

Notwithstanding the exemplary pains which are spent upon this "infusion à chaud," the fat still remains fat, gradually but inevitably undergoing change and becoming rancid. The question suggests itself whether the fat might not be replaced by the unalterable paraffin which has so successfully competed with fat in pharmacy. It might be thought that such a preparation as the unguentum paraffini of the German Pharmacopœia would be particularly suited to acquire the most delicate perfume and preserve it faithfully. But Professor Fluckiger was assured by M. Roure that this is by no means the case. Why this should be appears inexplicable, but the inapplicability of paraffin is so decided that even the addition of it to fat in the preparation of pommades by the foregoing method is said to have proved injurious. Professor Fluckiger considers this point worthy of further investigation, and remarks that results obtained by himself some experiments upon a small scale were hardly confirmatory of the statement.

In the incorporation of the most delicate perfumes with fat the above method of "infusion à chaud" is replaced by that of "enfleurage." For this purpose light square wooden frames, about 18 inches each way, in which a plate of glass can be placed, are used. All the frames and glass plates are of the same size; when piled up one upon another, therefore, they form small tolerably well-closed compartments. Upon each glass is spread a weighed quantity of fat in a thin layer, and this is strewn thickly with flowers. Sometimes, however, the one side of the glass plate is covered with flowers only, and the layer of fat is confined to the other glass wall of each compartment, so that contact of the flowers with the fat is avoided. When a perfumed oil is desired use may be made of cloths saturated with oil for the enfleurage. The fat is kept shut up in these glass compartments for a longer or shorter time according to the nature of the flowers and the quality of the article required and the flowers have to be repeatedly removed, even as often as every day. Many kinds of pommades require some weeks of enfleurage.

A portion of the pommades obtained by these methods is eventually used in the preparation of the odorous "extraits." This is the name by which the extracts obtained by treatment of these preparations (and other odorous substances) with strong alcohol are known in French perfumery. For this purpose the pommades are placed in copper drums, where by means of powerful stirrers a most intimate mixing of the alcohol with the fat is continued for hours. The alcohol takes up scarcely any of the fat, but the greater part of the odorous substances. By this method the odorous constituents, whether essential oils or other compounds is not known, which cannot be satisfactorily obtained by distillation, are transferred in a pure and unaltered form to the alcohol. The fat takes up little else from the respective flowers, and probably retains a small quantity of matter unconnected with the perfume, which it gives up very pure to the alcohol. After this has been removed the fat is placed in a still and the alcohol recovered for further use; the fat, on the contrary, is not again employed in any part of the manufacture. It would appear that decomposition commences during the long kneading with alcohol in contact with air, although the drums in which the "extraits" are made are kept well closed. But there can be no doubt the fat could be rendered serviceable again; at present it passes from the perfume manufacturer to the soap boiler.

Similar "extraits" may be prepared from plants, when no colouring matter interferes, by simple digestion with alcohol.

DECOMPOSITION OF OPTICALLY INACTIVE COMPOUNDS.*

BY E. JUNGFLEISCH.

The author considers that the separation or non-separation of inactive compounds by "compensation" is determined by the relative solubility of the inactive compound, and of the two compounds into which it is capable of being separated. If the original compound is less soluble than either of the compounds of which it is constituted, no separation is effected by crystallization; but if either of the constituent compounds is less soluble than the original compound, separation occurs under certain conditions when crystallization is attempted. This being the case, the result will vary at different temperatures; thus it has been noticed that sodium potassium tartrate can be crystallized without decomposition near 0°, the salt at this temperature being less soluble than either the dextrorotatory or lævorotatory salts which compose it. The unequal solubility of the two products of the decomposition also appears to be an important factor in producing the result. This has been investigated in the case of sodium ammonium racemate, a process for the separation of which into dextrorotatory and lævorotatory sodium ammonium tartrates has been devised by the author. As the result of a number of experiments, it is noticed that in the first crystallization the dextrorotatory salt is deposited in greater quantity than the lævorotatory, but in the second crystallization the reverse is the case. Further, a supersaturated solution of ammonium sodium racemate, from which the dextrorotatory and lævorotatory salts have been, as far as possible, separated by crystallization, when examined by the polariscope is feebly lævorotatory, and on the addition of boric acid becomes markedly so. These facts indicate the greater solubility of the lævorotatory salt in the saline liquid. The decomposition of cinchonine racemate into dextrorotatory and lævorotatory cinchonine tartrate, and of cinchonine paraphenylglycollate into the two active cinchonine phenylglycollates, may be explained by the wide difference in the solubilities of the constituent salts. The behaviour of paracamphoric acid also supports this view. When a hot concentrated solution of this acid is cooled and fractionally crystallized, the crystals which separate between 80° and 40° are strongly lævorotatory, whilst those formed below 40° are dextrorotatory. By recrystallizing these fractions they become more and more strongly lævo- or dextro-rotatory. In this way crystals were obtained containing 75 per cent. of the lævorotatory acid. When a solution of paracomphoric acid is crystallized, and the crystals allowed to remain in the cold in contact with the mother-liquor, they are reconverted into the original acid. The difference in the solubilty of the dextro- and lævo-rotatory camphoric acids can be still further increased by the addition of acetic acid.

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* From *Bull. Soc. Chim.*, xli., 222–226. Reprinted from the *Journal of the Chemical Society*.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 13, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelop s indorsed "Pharm. Journ."*

THE LOCAL GOVERNMENT BOARD AND THE SALE OF FOOD AND DRUGS ACT.

AMONG the multitudinous subjects that come under the cognizance of the Local Government Board in its relations with the local authorities throughout the country are the returns made by public analysts under the provisions of the Sale of Food and Drugs Act, and these have now for several years past been referred to in the annual report of the Board at greater or less length. From the returns in the Report for 1883–84, issued during the past week, it appears that a rather larger number of samples were last year analysed under the provisions of the Act than in the preceding year, the total number being 19,648. Only a very small proportion of these, 252, were submitted to the analysts by private purchasers, and the whole of the remainder were purchased by the local officials. This shows that the extent to which the machinery of the Act will be put in motion for the suppression of adulteration must depend mainly upon the local authorities, who are at liberty to manifest any degree of zeal they please, from practically ignoring the Act to coercing their officials into fussy activity. Nor does it require more than a glance at the tabular abstract of the returns—although it only discloses the sum of the work done by the collective local authorities in the different counties—to see that this is a liberty of which they freely avail themselves. It is noticeable, however, that the metropolitan districts still maintain a very high average in this respect, since the returns from them show that the samples analysed in London and suburbs numbered 5454, or nearly 28 per cent. of the total number analysed in England and Wales. In fact, complaint is made in the report that whilst in the metropolitan districts, in a large number of important boroughs and in about half the counties, the power given by the Act is exercised to an extent that may be considered fairly satisfactory, in the majority of the smaller boroughs and in a large proportion of the rural districts nothing at all is done.

Milk, as in former years, was the most frequent subject of analysis, the samples numbering 8119, or more than 41 per cent. of the whole. Next in order came spirits, 2174; butter, 1311; coffee, 1208; bread, 1041; mustard, 801; flour, 473; beer, 402; drugs, 304; sugar, 270; confectionery, 214; jam, 134; pickles and tinned vegetables, 155; wine, 89; and other articles, 3053. According to the returns the average of the adulterations was 15·04 per cent., against 15·07 per cent. in the previous year; but of course the proportions varied widely with the different articles. Spirit sellers enjoy the doubtful honour of heading the list, the proportion of examined samples of spirits reported as adulterated being 22·5 per cent., but it is so far satisfactory to be told that the adulteration consisted in dilution with water. The Act of 1879 allows the sale of gin containing a minimum of 32 per cent. of alcohol, but it appears that a great quantity is really sold containing less than 20 per cent. Milk sellers come next, with 20 per cent. of adulteration, rising, however, in the metropolitan districts to 26 per cent., and here again the adulterant is water. Coffee is the article reputed to be next in order, 19·1 per cent., and then comes butter, with 18 per cent., which, as the proportion was only 13·1 per cent. in the previous year, seems to indicate that either the sale of butterine for butter is increasing, or the analysts are becoming more expert in the detection of the substitution. "Drugs" are credited with 16·4 per cent. of adulteration and mustard with 15 per cent., but the percentages attributed to the remainder of the articles are much lower. It should not be forgotten, however, that these figures are based upon the gross returns of the public analysts, and that although nearly three thousand samples were reported to have been found adulterated, the local authorities in their discretion have refrained from taking legal proceedings in respect to a large proportion of them.

At the risk of repeating what has been said on previous occasions in these columns we feel it to be a duty once more to protest against the imputations that are put forward year after year, in almost the same language, by the writer of this part of the report, against the conduct of chemists and druggists; imputations which are precise in inverse proportion to the vagueness of the data upon which they are founded. Under the term "drugs" are included a number of substances more than equalling in variety all the other classes joined together, and sold largely by grocers and general dealers. Indeed, that samples of drugs are not as a rule obtained from chemists and druggists is shown by the fact that in the Report of the Local Government Board for 1882–83 attention was expressly called to the fact that some of the drugs condemned had been bought from grocers, and a semi-apology was put forward in respect to the difficulties unregistered persons met with in selling compounds that should contain preparations of opium. Nevertheless, the fact that 50 out of 304 samples belonging to this composite class, purchased from various tradesmen in different parts of the country, and probably in many cases not intended for use as medicine, were during last year reported as adulterated, is considered to be sufficient warrant for

speaking of the extensive sale of drugs which analysis shows to be not in accordance with the Pharmacopœia as very serious in regard to the public health. It is admitted that many of the samples reported against were probably not adulterated in the ordinary sense of the word, but were originally defective or had deteriorated through keeping; but it is not unfairly argued that prescriptions compounded with such drugs may fail altogether to produce the effect which would have been produced by drugs of proper quality. This is a proposition that we are not prepared to dispute; but we contend that neither the statistics quoted, nor any legal proceedings under the Act with which we are acquainted, warrant the assumption that the practice obtains of using such imperfect drugs in the dispensing of prescriptions. Neither do we think it fair, or indeed decent, for a public department, in the absence of any evidence that has undergone the test of publication, to make the general allegation, that "preparations of expen-"sive drugs, such as quinine, are either unduly diluted, "so that a prescription of three grains would contain "only two grains, or a cheap drug (*e.g.* cinchonine) "would be substituted." If the authorities whose duty it is to carry out the Act are in possession of evidence that such practices are carried on—as they, of course, may be, by isolated individuals—let them put the law in force, but do not let them compound for shirking their duty by putting forward imputations calculated to shake the faith of the public in a whole class of honourable men. Already there is ample evidence as to the reasonableness of our protest, in the fact that so influential a newspaper as the *Daily News* has asserted that "once in four times, on an average, a prescription made up at a chemist's shop is not composed of pure drugs," and has quoted in confirmation the above passage from the report of the Local Government Board.

THE RECENT EXPLOSION WHILE PREPARING COLOURED FIRE.

Amongst the "papers" issued on Wednesday was the report of the Inspector of Explosives upon the circumstances attending the recent explosion during the manufacture of coloured fire in the shop of Mr. Joseph Balkwill, chemist and druggist, Kingsbridge, by which an apprentice, named Crimp, lost his life. Major Cundill gives a detailed narrative of the circumstances, which agrees practically with the evidence given at the inquest (see before, p. 399), and he considers there can be no doubt that the explosion was due to Crimp having, in his master's absence, added sulphur to chlorate of potash in a mortar, and proceeded to pound the two together. With respect to the serious question as to the blame attaching in respect to the explosion, Major Cundill expresses his opinion absolutely that Mr. Balkwill was acting illegally in manufacturing coloured fires in his shop; that Crimp was acting under Mr. Balkwill's direct orders and supervision when he met with his death, and that as the death was a result of Mr. Balkwill's illegal action he is responsible for it. Major Cundill points out that the 4th section of the Act provides that the manufacture of gunpowder—and by another section this is made to apply to coloured fires—shall not, nor any process of such manufacture, be carried on except at a licensed factory for gunpowder, and that the manufacture of gunpowder (or coloured fire) in an unauthorized place involves the forfeiture of the product and a penalty of one hundred pounds for every day during which such manufacture is carried on. To this heavy penalty he considers Mr. Balkwill has rendered himself clearly liable, and possibly also for keeping and selling coloured fires on premises neither licensed nor registered for the purpose. Major Cundill says, "In *no* case would a chemist's (or other public) shop ever be licensed for the manufacture of any fireworks, especially of such especially dangerous fireworks as coloured fires containing chlorate." It is due to Mr. Balkwill to mention that the Government Inspector, whilst reporting thus adversely to him, testifies to the frank manner in which he gave his evidence.

We have again alluded to this case rather prominently partly because there really seems to be a great deal of ignorance in respect to the law applying to the preparing and keeping of coloured fires. The Government Inspector says he has reason to believe that illegal manufacture of this kind is rife in the county of Devon in the latter part of the year, and, if so, there is little probability that it is peculiar to that county. However this may be, it is desirable that the illegality of such practices should be made as widely known as possible. For apart from the fact that the money penalties incurred in breaches of the law as to explosives are very heavy, there is every probability that Major Cundill is right in assuming that in the event of the occurrence of another accident of a similar kind a coroner's jury would not return so lenient a verdict.

The Marine Department of the Board of Trade has just issued a "revised" Medical Scale for Passenger Ships. The only alteration from the Scale previously in force, as printed in the Calendar of the Pharmaceutical Society (p. 415), appears to be the insertion of "Concentrated Carbolated Creosote, 4 galls.," as an alternative substitute for the solution of Chloride of Zinc.

* * *

We have been requested to direct the attention of such of our readers as may be entitled to vote at the election to the British Orphan Asylum, Slough, in January next, to the case of John Harold Lees, the son of a chemist and druggist who died in 1882, and to say that the Secretary to the Pharmaceutical Society will be glad to receive proxies on his behalf.

* * *

It appears from the report on the births, deaths and marriages in Scotland in 1881, which can hardly be said to have been issued too promptly, that there were thirty deaths in Scotland due to poisoning in that year. The cases were, among the males,

laudanum, 4, potassium cyanide, 1, aconite, 1, opium, 2, carbolic acid, 1, phosphorus, 1, poison not stated, 1; among the females, laudanum, 1, phosphorus, 1, hydrocyanic acid 1, oxalic acid, 1, salts of sorrel, 1, "fly oil," 1, poison not stated, 3.

* * *

The *Scientific American* reports a curious case of a person in Ithaca receiving a severe electric shock whilst drawing water. At first it was thought the victim was the subject of paralysis or apoplexy, but the observation by the medical attendant that the inside of the thumb had been blistered raised a suspicion, which was confirmed upon another person trying the tap and receiving a similar, though milder, shock. Upon examination it was found that an electric light wire had come into contact with a "dead" telegraph wire connected with the house, so that when the dynamo of the electric light company was in operation, the current passed through the "dead" wire to the tinned roof of the house, and thence by way of a rain shoot to the water pipe leading to the sink, the circuit being completed by the unfortunate person, whilst drawing the water, placing one hand on the metal tap and the other on the iron lining of the sink.

* * *

On Monday morning next, at 9 a.m., the Assistant Professor of Chemistry in the Society's School of Pharmacy (Mr. Wyndham Dunstan) will deliver the first of the course of lectures on Organic Chemistry. On the same day at 3·30 p.m., Mr. Dunstan will also commence the delivery of Supplementary Lectures on Chemical Physics and Theoretical Chemistry, to be continued on Mondays and Thursdays. Separate entries may be made for these lectures upon application at the School.

* * *

The next meeting of the Manchester Pharmacy Students' Association will be held in the Materia Medica Museum, Owens College, on Thursday, December 18, at 8 p.m., when a paper will be read by Mr. Herbert Elborne on "Photography," and a Report on Pharmacy will be made by the Honorary Secretary, Mr. F. C. J. Bird.

* * *

The School of Pharmacy Students' Association will hold its next meeting on Thursday, December 18, when a paper on "Ionidium Ipecacuanha" will be read by Mr. J. B. Barnes, and a Report on Materia Medica will be made by Mr. J. O. Braithwaite.

* * *

At the next meeting of the Chemists' Assistants' Association at 103, Great Russell Street, next Wednesday, December 17, at 9 p.m., Mr. E. Baily will read a paper entitled "Our Mother Tongue."

* * *

The Royal Institution lectures "adapted to a juvenile auditory" are to be delivered this Christmas by Professor Tyndall, the subject being the "Sources of Electricity," and the dates December 27 and 30 and January 1, 3, 6 and 8. Among the other lectures announced are a course of four on "Digestion," to be delivered by Dr. Arthur Gamgee, on Tuesdays, March 3 to 24, and a course of eleven on "The New Chemistry," to be delivered by Professor Dewar, on Thursdays, January 15 to March 26. The first Friday evening meeting will be held on January 16, when Professor Tyndall will discourse on "Living Contagia.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 3rd instant, at three o'clock.

The President (Mr. J. E. Brunker, M.A.) in the chair.

The other members of the Council present were Messrs. Pring, Hodgson, Grindley, Simpson, Wells, Dr. Collins and Dr. Montgomery.

The Registrar read a letter from Dr. Kaye, Q.C., Clerk to the Privy Council, announcing that the Lords Justices had approved of the resolution passed by the Council on the 2nd of last July, by which they recognize the certificates in practical chemistry of the Government School of Science, South Kensington.

The letter was marked read.

A letter was received from Mr. William H. Greer, of 25, Aungier Street, Belfast, thanking the Council for their action in the above matter.

The Registrar read a letter, dated the 25th November, from Messrs. R. Price and Co., 26, Clare Street, Dublin, informing the Society of the death of the principal of the establishment, Dr. Robert Price, one of their licentiates, and stating that his trustees would carry on the business on the part of his three orphans.

The Registrar stated that he wrote back asking who was the gentleman who was to carry on the business, and received in reply a letter, dated the 28th of November, stating that Mr. J. J. Bernard, of Merrion, and Mr. John Robson, of Portarlington, were employed to carry on the business, both having been in Dr. Price's establishment for some months before his death.

The President said that upon the receipt of the first letter Mr. Merrall wrote by his directions inquiring whether the gentleman who was to carry on the business was a qualified man. The reply to that was the second letter, which did not seem quite satisfactory, because it did not show that the two gentlemen named in it, even if they were qualified, were actually managing the business.

Mr. Wells: Mr. Bernard is connected with the Donnybrook Dispensary, and therefore cannot spend all his time there.

The President said what the Act provided was that on the decease of the registered person his executor, administrator, or trustee might carry on the business so long as it was *bonâ fide* conducted by a duly qualified assistant, which meant either an apothecary or a pharmaceutical chemist registered under the Act. He did not think these requirements were satisfied in the present case.

Mr. Wells moved that the Registrar be directed to write to the representatives of the late Dr. Price calling their attention to sec. 32 of the Pharmacy Act, and asking if either of the gentlemen named in their last letter occupied the position of *bonâ fide* manager of the business.

Mr. Grindley seconded the motion, which was carried.

Some financial business having been disposed of, the Council adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifth general meeting was held at the Royal Institution on Thursday evening, December 4th, Mr. Edward Davies, F.C.S., F.I.C., (President), in the chair.

The minutes of last meeting were read and confirmed, and the donations to the library were announced.

There being no miscellaneous communication, the President called on Mr. M. Conroy, F.C.S., to read the paper of the evening, entitled—

The Estimation of Morphia in Opium.

BY MICHAEL CONROY, F.C.S.

More papers have perhaps been written on the estimation of morphia in opium than upon the valuation of any

other drug of the whole materia medica. Still, it is no exaggeration to say that nine-tenths of the published processes are worse than useless, since they have the tendency to mislead those who place confidence in them. I venture to think, however, that very few pharmacists take the trouble to assay the opium which they buy, and one can scarcely be surprised at this when the long and troublesome methods and the unsatisfactory results of most of them are considered. Take, for instance, our own official process (British Pharmacopœia) which, in careful hands gives very fair results, and which at the time of the publication of the present Pharmacopœia was possibly as good a plan as any published. Look, however, at the time required to arrive at the result. First, we are directed "to break down the opium and steep it in an ounce of water for *twenty-four hours*." After this it has to be percolated with the remainder of the water; the percolate then boiled with lime, evaporated, etc.; and lastly it has to stand another twenty-four hours for the morphia to separate. Here then, even with good management, we have to wait three days for the result. Others no doubt, like myself, have turned to the standard works and other literature of the day in the hope of meeting with a more expeditious process, and have been bewildered with the enormous and contradictory literature of the subject, and after trying some of what seemed the best methods have ultimately given them up and settled down to a more satisfactory process of their own devising, with a feeling that it was quite useless trying any more of those published. This, I confess, is what I did myself and it is only since the appearance of the present United States Pharmacopœia that I have changed my method of assay, and adopted, with some modifications, the plan there given. I find that this process is essentially the one devised by MM. Portes and Langlois (*Journ. de Pharm. et de Chim.*, Nov., 1881; and *Chem. News*, xlv., 67), and the same has been also, with slight alterations, adopted by the Société de Pharmacie of Paris. The process, therefore, being officially sanctioned, was the consideration which prompted me to give it a trial. As given in the United States Pharmacopœia, the test is as follows:—

Opium, in any condition to be valued 7 grams.
Lime, freshly slacked . . . . . 3 grams.
Chloride of ammonium . . . . . 3 grams.
Alcohol,
Stronger ether,
Distilled water, each a sufficient quantity,

"Triturate together the opium, lime, and 20 c.c. of distilled water, in a mortar, until a uniform mixture results; then add 50 c.c. of distilled water, and stir occasionally, during half an hour. Filter the mixture through a plaited filter, three to three and a half inches in diameter, into a wide mouth bottle or stoppered flask (having the capacity of about 120 c c. and marked at exactly 50 c.c.) until the filtrate reaches this mark. To the filtered liquid (representing 5 grams of opium) add 5 c.c. of alcohol and 25 c.c. of stronger ether and shake the mixture; then add the chloride of ammonium, shake well and frequently during half an hour, and set it aside for twelve hours. Counterbalance two small filters, place one within the other in a small funnel, and decant the ethereal layer as completely as practicable upon the filter. Add 10 c.c. of stronger ether to the contents of the bottle and rotate it; again decant the ethereal layer upon the filter, and afterwards wash the latter with 5 c.c. of stronger ether, added slowly and in portions. Now let the filter dry in the air, and pour upon it the liquid in the bottle, in portions, in such a way as to transfer the greater portion of the crystals to the filter. Wash the bottle, and transfer the remaining crystals to the filter, with several portions of distilled water, using not much more than 10 c.c. in all, and distributing the portions evenly upon the filter. Allow the filter to drain, and dry it, first by pressing it between sheets of bibulous paper, and afterwards at a temperature between 55° and 60° C. (131° to 140° F.). Weigh the crystals on the inner filter, counterbalancing by the outer filter. The weight of the crystals in grams, multiplied by twenty, equals the percentage of morphine in the opium taken."

We have here a process that fulfils the chief requirements of the dealer, manufacturer and the pharmacist, namely, *speed*; since by it a sample of opium may be put in hand on the evening of one day and finished early on the morning of the next. This, compared with the lengthy and tedious method of the B.P. and other published processes, is indeed a great improvement, and one that recommends itself to the busy analyst. How then does it work? And, are the results reliable? The first thing that strikes a practical chemist who has used the older processes, is the shortness of time allowed for maceration (half an hour), and, having myself grave doubts upon this point the following six experiments were put in hand, using in each case the same opium. Three were worked strictly according to the directions given in the U.S. Pharmacopœia, allowing only the half hour maceration therein directed, while the other three were macerated for twelve hours, but otherwise treated in the same manner. The percentages of morphia obtained were as follows:—

Half hour maceration.	Twelve hours maceration.
No. 1. . . 11·44	No. 1. . . 11·42
No. 2. . . 11·40	No. 2. . . 11·48
No. 3. . . 11·51	No. 3. . . 11·50

From this we find that half an hour's maceration is sufficient for the complete exhaustion of the opium, as the above figures show no practical difference in the amount of morphia recovered.

The next point that strikes one is the fact that no allowance is made for the increase of bulk which is due to the extractive matter of the opium. The directions are to take "50 c.c., representing 5 grams of opium." Now this is not correct, since this 50 c.c. contains the extractive of 5 grams of opium, equal to about 3 grams in the moist state in which it exists in opium. This, from experiments that I have tried, increases the bulk to 52 c.c., hence, we have here an error representing 4 per cent. of the morphia to be obtained. That no such allowance is made is certainly very strange when we find that the originators of the process, MM. Portes and Langlois, direct that 53 c.c. be taken to represent the 5 grams of opium. It cannot be that the compilers of the Pharmacopœia did not conceive this increase to be important when we find such strict instructions given representing the size of the filter, the exact quantity of water to be used in washing the precipitate, and other matters of less importance.

While on this part of the subject I may mention that there is no difficulty in obtaining the amount of filtrate required, if there be plenty of time to allow the filter to drain; but as one of the objects aimed at in the process is speed, it would be a considerable saving of time if 10 grams of opium and 100 c.c. of water were taken in the first instance, instead of 7 grams and 70 c.c. This would avoid loss of time as the 50 c.c. required would soon filter, and the extra opium required is trifling in value compared with the gain in time.

In nearly all the older processes the amount of opium liquor is much reduced by evaporation before the precipitation of the morphia, with the object of reducing the error due to the solubility of that alkaloid in the liquor, but here we have the morphia precipitated direct from a mixture of water, spirit, ether, lime and chloride of ammonia equal in bulk to 80 c.c. for 5 grams of opium, and the precipitate is further washed with ether and water, which, added to the 80 c.c., makes up a total of 105 c.c. The question then arises, to what extent is the morphia soluble in this quantity of liquor of so complex a nature, and also as to whether the solubility is constant. It will also be observed that the quantity of chloride of ammonium is used in very great excess, and its effect upon the solubility of the morphia is well worth con-

sidering, consequently these two points will be referred to later on.

The principle of the process is, however, excellent and the defects mentioned, though of much importance, are matters of detail that do not affect its beauty and simplicity. Without further delay then, I will give what I venture to call an improved process that I have adopted, and which, after considerable experience, has given most constant and reliable results. As most of us prefer working with our own weights and measures in preference to the metric, the quantities will be Anglicized.

Opium, in any condition .	200 grains.
Lime, freshly slaked . .	100 grains.
Water (distilled)	4 fluid ounces.
Ammonium chloride . . .	40 grains.
Ether, ·720	10 fluid drachms.
Sp. rect.	2 fluid drachms.

Triturate the opium and lime in a mortar until thoroughly combined; add gradually the water, continuing the trituration until a *perfectly smooth and uniform mixture* is produced. Stir the mixture frequently for half an hour, and place the whole in a filter of suitable size. Collect 2 fluid ounces and 38 minims of the filtrate (representing 100 grains of opium) and place it in a stoppered flask of 4 fluid ounces capacity. To this add the 2 fluid drachms of spirit, 8 fluid drachms of ether and the 40 grains ammonium chloride. Keep the mixture well shaken for half an hour, and set it aside for twelve hours. Counterbalance two small filters, and having placed one inside the other in a small funnel, decant the ethereal layer as completely as possible upon the filter. Add the remaining 2 fluid drachms of ether to the flask, shake gently and again decant the ethereal layer upon the filter. After the ethereal liquor has passed through, pour upon the filter the remaining contents of the flask in such a way as to transfer the whole or nearly the whole of the crystals to the filter. Wash any adhering crystals from the flask to the filter after the darker liquor has passed through, using 3 fluid drachms of water for the purpose. Allow the filter to drain, abstract as much water as possible by gently pressing it between several folds of filtering paper, and finally dry it at a temperature of 212° F. The result gives the percentage of morphia obtained from the opium.

The difference between this and the United States process is, as before stated, points of detail, the reasons for the alterations being as follows:—

An extra quantity of opium liquor is made in the first instance to save delay in filtering off the quantity required.

Two fluid ounces and 38 minims of the filtrate is taken to represent 100 grains of the opium, instead of 2 fluid ounces; the 38 minims representing the average increase in bulk due to the opium extractive.

The ammonium chloride is reduced by about one-third the quantity ordered in the United States Pharmacopœia, the reason for this being that the quantity therein ordered is much in excess, which is a matter of great moment, since an excess of this salt exerts considerable solvent action on freshly precipitated morphia, as the following will show. In these experiments the same opium was used and the process just described strictly adhered to, but varying the quantity of ammonium chloride:—

No.	Grains NH_4Cl used.	Morphia obtained.	
1 . . .	100	12·15	average of 3 experiments.
2 . . .	80	12·25	,, 3 ,,
3 . . .	60	12·70	,, 2 ,,
4 . . .	50	12·95	,, 3 ,,
5 . . .	40	13·05	,, 3 ,,
6 . . .	20	13·04	,, 2 ,,

From this, as well as other tests, I found that the solvent action of 40 grains of NH_4Cl was practically *nil*, and this quantity being sufficient to precipitate the morphia under any circumstances, and in any sample of opium, however rich in morphia, it is quite unnecessary to use more.

Now the question comes as to what quantity of morphia is held in solution after the whole of the available quantity has been recovered by precipitation on standing twelve hours. To ascertain this, as far as practicable, the following experiment was made:—Ten grains of pure morphia was dissolved in 2 fluid ounces and 38 minims of lime water to represent the quantity of opium solution used in the improved process above described. To this was added the spirit, ether and ammonium chloride. After standing twelve hours the precipitated morphia was collected on a counterpoised filter, washed with ether and water as directed and weighed. The amount recovered was 9·08 grains, and three other experiments similarly carried out gave respectively 9·05, 9·02 and 9·06 grains, thus showing that the quantity of morphia held in solution is, practically speaking, 1 grain. These figures also show that the quantity retained is uniform.

There is still another point to be decided in connection with this process which I have not had time to enter into for this meeting, but which I hope to have the pleasure of laying before you at an early date. It is as to whether there is anything gained by allowing the solution to stand for twelve hours after the addition of the ammonium chloride. My impression is that two or three hours is quite sufficient, but of course this must be ascertained by practical experiment.

In conclusion, I have only to call your attention to the following advantages of the process as compared with others:—

1st. Its greater rapidity and simplicity.

2nd. The more constant and reliable results obtained by it.

3rd. The greater purity of the morphia recovered than by any other process where direct precipitation is employed.

4th. The avoidance of evaporation and loss by crystallization from alcohol.

I have to express my obligations to Messrs. Evans, Sons and Co., to whom I am indebted for supplying the material, and allowing these experiments to be conducted in their laboratories, expressly for this paper.

The President asked if the lime was weighed as quicklime and afterwards slacked, or as slacked lime. He was much interested in the process which gave results in dealing with a complex organic matter, comparable in the closeness of the results with any defined inorganic substance. His own experience was that the Pharmacopœia process was tedious and inaccurate. He congratulated the members on the valuable papers containing original research which had been contributed this season, among which Mr. Conroy's was remarkable for the thoroughness of the examination of details, the simplification of the process, and the saving of time.

Mr. A. C. Abraham, F.C.S., said that Mr. Conroy had as usual brought before them a thoroughly practical and valuable paper. He (Mr. Abraham) did not feel competent to say much, in part because Mr. Conroy had so completely protected himself from criticism by his experiments, and also because the points involved could not be easily grasped during the reading of the paper, but would require the paper to be re-read when in print. The most striking point about the process was the great purity of the product. He had never been able to get the morphia out by the Pharmacopœia process anything like so pure, and recently a lot which he had recrystallized was still far from equal in purity to the specimens shown. He was not sure about the quantity of chloride of ammonium which might have another function than that primarily supposed, which function might not be equally brought into play with all samples. He had great pleasure in moving a very cordial vote of thanks to Mr. Conroy for this valuable paper.

Mr. J. S. Ward said he had listened with much

pleasure to the paper, and the process suggested seemed to be a very great improvement on that of the B.P., and he further thought that Mr. Conroy in his modification of details had made two considerable improvements on the U.S. official process. What he referred to were—1st, drying the precipitated morphia at 212° F. (100° C.) instead of at 55° C. to 60° C., as he had frequently found it very tedious work to get rid of the last traces of moisture from organic precipitates at a lower temperature than about 100° C. The second point was the correction of volume for the amount of extractive matter taken up by the water, which appeared to be an oversight in the U.S. official process. Altogether he considered the paper so well worked out that it almost defied criticism; but he should like to ask Mr. Conroy if he had tried precipitation of the alkaloid by bicarbonates, as he believed that alkaloids generally were much less soluble in excess of bicarbonates than in hydrates; and he would also like to ask if, in filtering the mixture of spirit, ether and water, Mr. Conroy had first moistened the filter paper with the fluid he desired to pass through first, as he believed that filter papers thus moistened had a kind of selective action upon the mixture to be filtered.

Mr. A. H. Samuel, F.C.S., said that he did not claim any practical experience in the analysis of opium, but he considered the paper, to which they had just listened, to be a very able one, and he personally derived much information from it. He had therefore much pleasure in seconding the vote of thanks which had been proposed by Mr. Abraham.

The vote was then put from the chair, and carried by acclamation.

Mr. Conroy thanked the meeting for the kindly manner in which they had received his paper, and in reply to the question which had been asked, said the lime was weighed as slacked lime. He had not tried the mode of precipitation mentioned by Mr. Ward, and was not aware that it was practised. In reference to moistening the filter, he might say that if the ethereal layer were carefully filtered through first there would not be much difficulty experienced, but he had no doubt that the plan proposed by Mr. Ward was an excellent one.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the session was held in the house of the Pharmaceutical Society, 36, York Place, on the evening of Wednesday, November 26, at 9.15. The President, Mr. W. S. Turnbull, occupied the chair.

The minutes of the former meeting were read and confirmed.

Mr W. H. Duncan read a paper on "Carnivorous Plants." He said that more than a century ago, Ellis drew attention to the capture of insects by the Venus's fly-trap plant, but the subject was ignored until Darwin made known the result of his researches. By laborious experiments, Darwin placed beyond all reasonable doubt the fact that there are certain plants which not only entrap insects, but also digest the nitrogenous matters by means of a fluid secretion from the leaf, which secretion, like the gastric juice, becomes distinctly acid when excited by the presence of food. The essayist then gave interesting descriptions of the Venus's fly-trap, sundew, the pitcher plants (Sarracenia and Nepenthe) and the butterworts. He concluded by describing some experiments that had been made to prove that these plants benefited by preying on animals. Fresh specimens, complemented by a series of well-executed diagrams, were shown by the essayist. The paper was discussed by Messrs. Henry, Hill, MacEwan, Stephenson and Turnbull. A hearty vote of thanks was awarded to Mr. Duncan.

Mr. J. R. Hill then gave a lucid description of the cyclosis of protoplasm in the vegetable cell. A discussion ensued, taken part in by the President, Messrs. Henry, MacEwan and Pirie. Mr. Hill received the cordial thanks of the meeting.

Reports from the Conversazione and Ball Committee and from the Prize Committee were then adopted, after which some queries were read, which concluded the business.

The fourth meeting of the session was held in the house of the Pharmaceutical Society, 36, York Place, on the evening of Wednesday, December 3. Mr. W. S. Turnbull, President, in the chair.

The minutes of the previous meeting having been read and adopted, Mr. J. R. Hill delivered a lecture on—

The Study of Materia Medica.

He began by stating that he purposed on this occasion to address especially those whom he might call pharmaceutical undergraduates, who were looking forward, perhaps with some anxiety, to the passing of their first professional examination. To those who had happily got beyond this stage he might seem to be in the position of "carrying coals to Newcastle," and he had to ask any such to excuse him on the ground of the special object which he had in view.

He thought it was a very great advantage that the study of materia medica was one of great interest, whether looked at from a historical or practical point of view. It was a great advantage, inasmuch as they, as pharmaceutical students, were of necessity compelled to master the subject, and were it a dreary, uninteresting and repulsive study the burden would be very much heavier to bear. It was deeply interesting and not a little amusing to trace the progress of materia medica from ancient times down through the ages to our own day. It was hardly possible to name any substance, conceivable or inconceivable, that had not at one time or another been credited with medicinal properties. What an extraordinary collection of materials do we find, for instance, in the materia medica of a period even so recent as the first appearance of the London Pharmacopœia in 1618. We find, for instance, snails, vipers, the urine and excrement of men and beasts, the thigh-bone of a hanged man, etc., gravely extolled as remedial agents.

Before the unfolding of chemical science we find the ashes of plants, all practically consisting of nothing more or less than carbonate of potash, credited with distinct and different medical properties, a state of things of which we have interesting survivals even at the present day. It sometimes happens, for instance, that salt of tartar is asked for under the name of salt of wormwood.

But the marvellous development of chemical, botanical and general medical science within recent times has purged the materia medica of the great mass of loathsome, revolting and utterly absurd rubbish with which it had been loaded during generations of ignorant empiricism. He confessed to feeling strongly tempted to enter at large on this aspect of his subject, but consideration for the practical object in view led him to restrain the desire. For those who were inclined to follow out this line of study he could recommend nothing better than the opening chapters of that well written and most interesting work, Paris's 'Pharmacologia,' a copy of which would be found in the library of the North British Branch.

The advancement of science had introduced a system of rationalism in medical treatment which had brought the materia medica within something more like reasonable bounds. But it never could be stationary. New diseases were coming to the front demanding new remedies, and the mighty agency of fashion was a constant source of change. Then the modern development of preventive medicine, including sanitation and hygiene, and such new departures as, for instance, the Listerian system of antiseptic surgery, have introduced a whole multitude of new remedies, so that the materia medica is still a field of vast extent and complexity. But we must not delay with mere generalities.

When we begin the study of any subject the first thing to be done is to find out the exact scope and compass of the task before us.

The words materia medica, literarily translated, mean the matter or stuff relating to physic, and may be defined as the agents employed by physicians in the prevention and cure of disease. You will see at once that the term is a very comprehensive one and various plans have been suggested for separating it into departments. Thus we have acology, therapeutics, dietetics, hygiene, etc., which do not specially concern us to-night. The department which specially falls within our province being that of pharmacology, which, in its turn, is subdivided into three sections, of pharmacognosy, pharmacy and pharmacodynamics. The last of the three deals with the actions and uses of drugs, and, therefore, belongs to the domain of the physician, while the first two are our special sphere. They may be defined as follows :—Circumstances which affect the condition of simple and compound medicines during their passage from a state of nature to the physician's hands, viz.: their source, collection, preservation, characters, qualities, purity, preparations, etc. This, it was pointed out, was the special department of the pharmacist and a quotation was made from the address issued by the Pharmaceutical Society in 1841, to show that the development of this department of medical science was the object of those who founded the Society. The subject of pharmacy comes under a separate section of the examination scheme, and consequently we limit ourselves to the single section of pharmacognosy. But even this term is too comprehensive, because it includes all the inorganic chemical substances used in medicine, and these are properly included under the separate section of chemistry. We must, therefore, still further limit ourselves to the organic materia medica.

In setting about the study of the organic materia medica some preliminary preparation is eminently desirable. We should first of all endeavour to acquire an elementary knowledge of the leading facts and principles of chemical and botanical science and also to have a slight general acquaintance with elementary zoology and physiology. The first two are very important, the latter less so. In practical microscopy, we sometimes find that in the examination of an object, the transmitted light from the small reflector under the microscope stage is not sufficient to reveal its characteristic features. In these circumstances we make use of a condensing lens, by which the rays of light are made to converge and focussed upon the object ; thus enabling us to discern the features which had previously escaped observation. In the same way we may compare our knowledge of the sciences referred to as so many rays of light which we gather up and focus upon the subject of the organic materia medica, and, in the stronger and clearer light thus brought to bear, we are able to apprehend and comprehend the various facts that come under our observation. Having said this, however, experience led him to add that though very desirable they were not absolutely essential, and it was possible to attain to a considerable acquaintance with the materia medica without such acquirements. Sometimes we were compelled to shape our course according to circumstances, and he strongly advised all students not to allow the want of these accessories to prevent them taking advantage of such opportunities as came in their way.

The possession of a good collection of materia medica specimens was also described as an essential requisite in the study of this subject. Many articles of the materia medica would be met with in most chemists' shops, but others would not, and Edinburgh students were singularly favoured by having a museum containing all that was required, and he strongly urged them to take full advantage of the facilities which the Society had thus put within their reach.

With regard to the order in which the articles of the materia medica should be studied, he recommended the method of taking them according to the natural systematic arrangement followed in such books as Scoresby Jackson or Royle's 'Materia Medica,' which he especially commended as useful handbooks for pharmaceutical students. The advantages of this plan of study were three in number. 1st. We thus became acquainted with the analogies subsisting between the various plants. 2nd. We studied all the plants of one order together, and thus fixed them in our memory, as members of one family. 3rd. By this means we incidentally and without any extra effort were committing to memory a thoroughly scientific classification of the articles of the materia medica.

Having settled these preliminaries, he now proceeded to make remarks on "the student at work," taking as a text, the paragraph of the Minor examination syllabus under the heading "Materia Medica," viz:—

"To recognize specimens of roots, etc., used in medicine; give the botanical and zoological names of the plants, etc., yielding them, and the natural families to which they belong; name the countries and sources from which they are obtained, the official preparations into which they enter, and judge the quality and freedom from adulteration or otherwise of the specimens."

According to the text the first thing to be learned is the *recognition* of specimens. To do this the student should have the specimen before him, turn up the characters as given in the text-book and endeavour to find them in the specimen and not rest satisfied with a mere surface acquaintance. This was practically illustrated by the root of *Aconitum Napellus* and the three varieties of buchu leaves. In connection with the former, specimens of *Aconitum ferox* and *Aconitum hetrophyllum* were also shown, and the necessity for acquiring some knowledge of the allied members of the families of the more important officinal drugs was pointed out.

The second thing to be learned is the *botanical or zoological sources* of the specimens; that is, to give the *accurate* botanical or zoological names and the natural families to which they belong. "Thus *Aconitum Napellus*, Nat. Ord. Ranunculaceæ."

Third comes the *geographical sources.* There were two ways of learning this part of the subject. This was illustrated by a reference to opium, the official source of which was Smyrna. Some students contented themselves with committing to memory the fact that opium came from Smyrna, without having any idea as to the quarter of the world in which Symrna was to be found, consequently such a student might as well say at once that he did not know the geographical source of opium. It was a great help to know not only the name but also the geographical position of the places from which each specimen was obtained, and for this purpose he recommended the use of a habitat map or any good school atlas.

Fourth we have the *sources* from which the articles of the materia medica are procured. Thus opium is obtained from the unripe capsule of *Papaver somniferum* by making incisions and collecting the milky juice which exudes ; scammony is obtained from the living root of *Convolvulus scammonia*; and so on. It was here that the student could most conveniently classify the various specimens in separate groups according to their nature; thus gums, resins, gumresins, balsams, roots, leaves, etc.

Fifth in order come the *officinal preparations into which they enter.* Thus, taking *Aconitum Napellus* as an example, we have from the fresh leaves an extract, and from the dried root liniment, tincture and the alkaloid aconitia.

In the sixth place we are required to judge of their quality and freedom from adulteration or otherwise. That involved an intimate knowledge of the *characters and tests.* If a specimen possessed all the official characters we were justified in saying that it was of good quality and *vice versa.* The subject of adulteration was illustrated by reference to two of the official tests for scammony. It should not effervesce on the addition of

hydrochloric acid, and should not strike a blue colour with the iodine test. Many students made the mistake of resting satisfied with this imperfect knowledge and could not give the reason for these tests or state what they were designed to detect. Then again, even though they did know that the iodine test was for the detection of starch, they were not sufficiently acquainted with the details of the *modus operandi* to state correctly how they would proceed if called upon to report practically as to the purity or otherwise of any specimen of scammony that might be submitted to them. It was a very helpful plan to put one's self in the attitude of actually performing the tests under consideration and ask one's self the question, How would I proceed if called upon to examine and report upon this drug?

This completed the subject so far as actually stated in the syllabus, but it did not sufficiently explain all that was required of a candidate in materia medica. Consequently he added the further seventh heading of *active constituents and the best menstruum for the exhaustion of each drug*. Every day's experience went to show that the proximate principles of drugs were becoming of greater importance, and he strongly urged all students to master the subject of *active constituents such as alkaloids, glucosides, resins, volatile oils, organic acids, etc.*

The subject of the best menstruum was illustrated by reference to opium and nux vomica. In the case of the former water was quite efficient and a liquid extract containing the active constituents of the drug might be prepared by the use of such a menstruum, but it was quite inadmissable in the case of nux vomica, which could be most efficiently exhausted by the use of dilute alcohol.

There were three points to which he alluded in conclusion. It was hardly possible to read intelligently any modern book or journal dealing with the subject of materia medica without possessing some acquaintance with the practical use of the microscope, and those who had the time would do well to devote some attention to this increasingly important study. The matter of expense should not be allowed to have too much weight, as, speaking from experience, he could say that a very considerable amount of microscopic work might be done with an instrument costing only 10*s.* 6*d.* He desired also in the most emphatic terms to counsel all students to beware of the error of regarding the passing of the examinations as the ultimate object of their studies. This should be regarded only as a valuable stimulus in the acquirement of scientific knowledge which would fit them for the responsible duties of life in the profession of which they had made choice. He strongly recommended them to be thorough and lay a good foundation, above all things avoiding what might be an expeditious, but was in every respect an eminently unsatisfactory method, namely, the system known as cram. The man who passed the examinations by a process of diligent cramming must ever afterwards be upbraided by the thought that he had by means of a dexterous trick got himself into a position for which, in his inner consciousness, he feels he is not duly qualified. We know, moreover, that he who would keep abreast of the times in materia medica must be constantly reading the latest contributions of scientific observation and research; but such a man, possessing only a superficial knowledge of facts, has no heart for such employment and must of necessity be left behind in the onward march of pharmacy.

The subject of long hours was not exactly an article of the materia medica, but it had an intimate practical bearing on the remarks that had been made, and he would refer to the subject just in a word or two. He regretted their long hours; but did not, meantime, intend to propose any amelioration. What he wanted to do was rather to warn them against the too common error of supposing that their long hours were an insuperable obstacle to any hope of becoming graduates of pharmacy. A glance at the lives of men who had risen to positions of eminence in any department of life would almost always show that such men had great difficulties to contend with. That they were not conquered by these difficulties, but by resolute courage triumphed over them, and rose to high positions in spite of them.

The lecture was well received by a large audience, and on a motion by Mr. MacEwan, seconded by Mr. Pirie, a cordial vote of thanks was awarded to Mr. Hill.

Several queries were then submitted, which gave rise to an interesting discussion.

A specimen of Rio ipecacuanha, presented by Messrs. Wright, Layman and Umney, was described by Mr. MacEwan, and, on the motion of the President, a vote of thanks was accorded the senders.

It having been intimated that at the next meeting, to be held on Wednesday, December 17, a paper would be read by Mr. T. Stephenson, on "The Life of a Plant," the proceedings terminated.

HAWICK PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The third evening meeting of this Association was held on December 2. There was a large attendance. In the absence of the President the chair was taken by Mr. Dechan, who, in introducing the business, said that owing to two of their members, whose names were down on the syllabus for papers in November and December, having left town they were unable to have a meeting last month. Mr. Maben would, however, that night take the place of one of the absentees.

Mr. Maben then proceeded to read a paper on "Condensed Milk," which is printed on p. 461.

At the close of the paper,

Mr. Pinkerton, Edinburgh, said he had often heard the relative advantages and disadvantages of condensed milk discussed in private, but he had never seen the question gone into in the very complete way in which it had been treated by Mr. Maben. The supply of condensed milk was practically inexhaustible, even though the demand was constantly increasing, and this paper would, by giving the public greater confidence in the milk, tend to increase the demand still further. He concluded by moving a vote of thanks to Mr. Maben.

Mr. Carmichael expressed the pleasure with which he had listened to the paper, and also his gratification with the evidence afforded by it of the original work that was being carried on in that laboratory.

The vote of thanks then was passed.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of the above Society was held on Thursday, Dec. 4, Dr. Perkin, F.R.S., President, in the chair.

The following certificates were read for the first time:—W. L. Clarke, J. N. Collie, A. E. Dixon, G. Embrey, G. S. Jones, F. Rindskopf, H. White.

Mr. S. U. Pickering then read a paper on—

Calorimetric Determinations of Magnesium Sulphate.—The heat of dissolution of monohydrated magnesium sulphate is given by Graham as 13,200 cal., by Favre as 10,986, and by Thomsen as 13,300. None give any details of the preparation or analysis of the salt which they used. The author found it impossible to determine the sulphur by means of barium chloride with the requisite accuracy, the sulphur trioxide was found to be 1 to 1·5 per cent. too high. The only reliable method for ascertaining the composition of any magnesium sulphate is a determination of the water. When the heptahydrated salt is heated to 100°–130° it retains about $1\frac{1}{9}$ H_2O, this excess of $\frac{1}{9}$th H_2O may be expelled by heating to 150°-160°, but if this temperature be exceeded some anhydrous salt will be formed. As a mean result the author finds that $MgSO_4H_2O + 420\,H_2O$ evolves 12,131 cal. Favre's salt probably contained $1\frac{1}{9}$ H_2O. Thomsen's

specimen, on the other hand, may have contained some anhydrous salt. The anhydrous salt $MgSO_4 + 420\,H_2O$ evolves 20,765 cal.

Mr. Howard confirmed the statement of Mr. Pickering as to the very great difficulty of determining the sulphuric acid in magnesium sulphate by precipitation with barium chloride.

Dr. Japp then read a paper on—

Condensation Compounds of Benzil with Ethyl Alcohol. By Miss M. E. Owens and Dr. F. R. Japp.—In preparing benzilic acid by heating benzil with alcoholic potash, Jena observed the formation of a neutral compound fusing at 200° to which he gave the formula $C_{14}H_{12}O_2$. Limpricht and Schwanert obtained the same body by heating benzoin and alcoholic potash with access of air and concluded that it was a derivative of benzoin and had the formula $C_{30}H_{26}O_4$. The authors of the present paper by the protracted action of very dilute alcoholic potash upon benzil in the cold have prepared this substance in large quantity, the yield being 60 per cent. The analyses lead to the formula $C_{30}H_{24}O_4$, its formation may be represented, $2\,C_{14}H_{10}O + C_2H_6O = C_{30}H_{24}O_4 + H_2O$. Ten grams of caustic potash were dissolved in 2500 c.c. of alcohol and 200 grams of benzil in fine powder added. The whole was well shaken and allowed to stand for about a fortnight with occasional shaking. The new body gradually separates out as a crystalline powder. The substance after purification fused 200°–201°. It crystallizes from alcohol with a molecule of alcohol of crystallization which seems to have been overlooked by Limpricht and Schwanert. When crystallized from benzene it also contains benzene of crystallization. When heated with acetic acid a compound of the condensation product with acetic acid is obtained, but no true acetyl derivative could be prepared either by the action of acetic anhydride or acetyl chloride. A second condensation product was found in the mother-liquors fusing at 232° and having the formula $C_{46}H_{34}O_4$. The authors have also examined the reaction of dilute alcoholic potash on benzoin and promise an account of it in a future paper.

The Secretary then read a—

Note on the Solubility of certain Salts in Fused Nitrate of Soda. By F. B. Guthrie.—The author has experimented with the sulphates, chromates and carbonates of barium, strontium, calcium and lead. The salts were added in small quantities to the fused nitrate of soda with stirring, the whole was allowed to cool and after partial solidification the remaining liquid was poured out and analysed. The chief results obtained are solubility of barium sulphate, 2·6 per cent.; barium chromate, 0·205 per cent.; barium carbonate, 0·916 per cent. The strontium salts taken in the same order gave 1·845, 2·133 and 0·69; calcium salts, 1·477, 0·547, 0·294; lead salts, 6·82, 0·245; lead carbonate decomposed at the temperature of fusing nitrate of soda.

The following paper was also read by the Secretary—

On certain Derivatives of Isodinaphthyl. By A. Staub and Watson Smith.—In a former paper it was suggested that "by gentle oxidation of the dinaphthyls the corresponding isomeric naphthoic acids may be obtained." The authors, however, find that isodinaphthyl is not amenable to gentle oxidation. Strong nitric acid in the cold gives a nitro-body, dilute nitric acid in sealed tubes forms phthalic acid, potassium permanganate also gave phthalic acid, chromic acid in glacial acetic acid, however, produced isodinaphthyl quinone $C_{20}H_{10}O_4$, a yellow amorphous powder, melting with decomposition at 250°–260°. By the action of strong nitric acid on isodinaphthyl a tetranitro body, $C_{20}H_{10}(NO_2)_4$, was obtained as an amorphous brownish-yellow powder melting with decomposition about 150°. By the action of zinc dust a tetramido body was formed. In conclusion, the authors give a list of the compounds of this remarkably stable dinaphthyl which have been obtained.

The Society then adjourned to December 18, when a ballot for the election of Fellows will be held.

SOCIETY OF ARTS.

The Preparation of Butterine.

On Wednesday the 10th inst., Dr. Odling presided at a meeting held by the Society of Arts, at which an interesting paper upon "The Preparation of Butterine" was read by Mr. Anton Jurgens. The paper, which included a description of the well-known method of preparation of butterine at present in vogue, and referred especially to the substitution of the compound for butter, was followed by a somewhat lengthy discussion. The raw material worked upon was described as consisting of animal fat, divided in small pieces, melted and strained. This part of the operation is performed in England, one firm in London turning out from ten to twenty tons per week, and the fat in a soft greasy state, know as oleomargarine, is then exported to Holland. The principal treatment in Holland consisted in churning the oleomargarine with milk to impart to it a flavour of butter, and washing it freely with water to impart firmness and consistency. From the manufactories at Oss about 150 tons per week of butterine were sent to England alone, and 10,000 gallons of milk per week were used in its manufacture. It consisted of oleomargarine, milk, pure vegetable oil and real butter. Throughout the whole of the manipulations it was necessary to preserve the greatest cleanliness, and Mr. Jurgens assured the meeting that the manufactories of butterine were in all respects as clean as an English dairy. As regards butterine as a substitute for butter Mr. Jurgens stated that he wished the butterine to be sold as such, and not as butter. He acknowledged that the manufactured material could not rival in flavour the first-class butter, although he considered it surpassed a great quantity of butter of inferior quality sold at the present time. It became impossible to supply the immense population of England with pure butter, and therefore as the working classes, at least, were likely to go short, Mr. Jurgens argued there was no reason why they should not be provided with the next best substitute. As showing the growing demand for butterine Mr. Jurgens mentioned that in 1883 probably as much as 40,000 tons of this article was imported into England, and he showed that it stood sixth in the list of exported articles in Holland arranged as regards their profits, those of last year amounting to £11,700.

In the discussion which followed, some pointed remarks were made by Professor Redwood and Mr. Otto Hehner. The former said that although from his position as public analyst he felt almost called upon to condemn butterine, because of its being used as an adulterant, yet he considered it should be freely encouraged as an article of diet. Mr. Hehner strongly objected to butterine, because it is frequently sold as butter, the resemblance making it more apt to deceive the purchaser. He considered it would never be a complete substitute for butter, for although it was a popular idea that it did not matter from what part of the body the animal fat was taken, yet it made a material difference, as butter was the most easy to saponify and therefore presented less obstacles to digestion, besides having a peculiar aroma of its own. As for its use as an adulterant in butter, it was easily distinguished, cocoa-nut oil being the only fat showing an approximate resemblance to butter. In closing the discussion, Dr. Olding said that he thought butterine answered the important tests of economy, palatability and wholesomeness, and should therefore be warmely welcomed. Regarding the plea that butter had an aroma of its own, he considered a great number of people could not afford to pay a shilling per pound for aroma, and as long as butterine was sold under its proper name he could see no objectlon to its use.

BOOK RECEIVED.

The Chemists and Druggists' Diary. 1885. London 42, Cannon Street. From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Benevolent Fund.

Sir,—In looking over the report of the election of annuitants from the Benevolent Fund I see that while 5923 voting papers were issued only 4033 were returned, leaving a voting power of 1900 unrecorded. In conjunction with many others I cannot but deplore the supineness of the 1900 subscribers who failed to record their votes on behalf of some of the candidates appealing for support from a Fund to which many, either themselves or theirs, have largely contributed in earlier and happier days.

I would suggest that in future an urgent whip should be sent out with the voting papers, earnestly requesting subscribers not to allow this amount of voting power to lie dormant, but to give practical effect to their subscriptions by filling up their papers and returning them in due course before the day of election. They cannot err in so noble a cause.

61, *Princess Street, Leicester.* E. H. Butler.

Sir,—I consider an impetus might be given to the Benevolent Fund by the election of approved candidates in the rotation of their application, without ballot and its incidental expenses.

I, although doing badly, would subscribe half-a-guinea yearly were this brought about.

12, *Lowesmoor, Worcester.* William Morris.

Liquid Extract of Cinchona.

Sir,—Dr. Paul is reported to have said, at the last Evening Meeting, that "the proportion of (hydrochloric) acid, recommended by Dr. De Vrij, was double that used by Professor Redwood."

Reference to Dr. De Vrij's formula, as published in the Journal of February 25, 1882, vol. xii., p. 710, will show that the quantity of normal hydrochloric acid recommended by Dr. De Vrij for 100 parts of bark of, at least, 6 per cent. of alkaloids, is 38 parts. The quantity used by Professor Redwood for a pound of bark of "5 to 6 per cent. of total alkaloids" is half a fluid ounce. As far as any comparison can be made between formulæ which, as stated above, are neither of them absolutely definite, the proportions of acid are in each case the same. I may add to this that Dr. De Vrij's later directions are absolutely exact, and they prescribe 37·5 parts of normal hydrochloric acid for 100 parts of bark of exactly 6 per cent. alkaloids. For bark of 5 per cent. alkaloids the proportion would be 31·25 parts of acid. Richd. W. Giles.

[*** The report referred to by Mr. Giles is quite correct, and the statement as to the quantity of hydrochloric acid recommended by Dr. De Vrij was taken from the formula for Dr. De Vrij's process in a later publication than that Mr. Giles refers to, viz., Hager's "Pharmaceutischen Praxis," 1883, where the proportions ordered are 10 parts acid (1·124 sp. gr.) to 100 parts of 6·4 per cent. bark, or more than twice as much as Professor Redwood proposes to use. Mr. Giles may, however, be better able to say what Dr. De Vrij means than anyone else; but we must be content with such knowledge as is accessible.—Ed. Pharm. Journ.].

Sir,—Some outside experiences on the above subject may be opportunely related at the present time. In March, 1881, I had occasion to work up a batch of 16 lbs. of yellow bark into fluid extract by the B.P. process. It consisted of equal parts of East Indian and the official B.P. *Cinchona Calisaya* in coarse powder. After the production of the 64 fluid ounces of liquid extract, the so-called "spent" bark was worked up for total alkaloids, as a trial experiment, in order to see whether it would pay on the large scale for cost of materials and labour employed. The process adopted was a modification of that by Broughton for the cheap production of a "cinchona febrifuge" in the Government plantations in India. (*Vide* 'Year-Book of Pharmacy' for 1877, p. 267.)

The bark was macerated three times with distilled water acidulated with HCl at a laboratory heat of about 90° F. for twenty-four hours, and the product of each separate maceration pressed off, evaporated to a low bulk over a gas flame, filtered, and precipitated with a strong solution of NaHO in slight excess. The dark coloured precipitates when dried weighed respectively 7 ozs., 3½ ozs. and 1½ oz.

The bark was still found to be perceptibly bitter to the taste when chewed, and the opinion, till then held firmly by myself, that dilute HCl would quickly extract all the alkaloids from cinchona bark was reluctantly abandoned. To account for its partial failure, it was assumed that, firstly, the bark was not finely divided enough; secondly, that a considerable portion of the HCl used must have been occupied in effecting the transformation of the cinchotannic acid into cinchona red and sugar, in addition to dissolving out alkaloids.

Whether this assumption should prove to be correct or otherwise, it merits some consideration in framing a new official B.P. process based on the power of HCl to break up and dissolve the alkaloidal cinchotannates existing in the bark, more especially as any particular form of bark having a definite alkaloidal or cinchotannic percentage can never be guaranteed for any length of time, bearing in mind the (as yet) dimly understood effects of climate and other causes on cinchona plants, together with their predisposition to hybridize. The differing results obtained by Professor Redwood and Dr. Paul, striking though they be, can easily be reconciled on considering the above probabilities. In conclusion, there are reasons for believing that the process now official in the United States Pharmacopœia for fluid extract of cinchona (in which glycerine and strong alcohol are used in conjunction with water as solvents) is a much more satisfactory representative of a fluid extract from a pharmaceutical point of view than the one at present official in the B.P. It is based on a series of experiments published by Taylor in the *American Journal of Pharmacy* for January, 1865, but no systematic analyses of the bark or final product are given. A series of exhaustive trials of this process with different barks, together with an analysis of each and their final products, could scarcely fail to prove fertile in Professor Redwood's hands.

George Smith.

Sir,—Before Professor Redwood's preparation finds a place in the British Pharmacopœia I sincerely hope he will put it in the hands of some medical man accustomed to use bark and its preparations. To show the importance of this suggestion I give the following facts.

About eighteen years ago a physician prescribed some Battley's liq. cinchonæ for a lady living in one of the inland counties; to his surprise he received a letter from her husband asking what the medicine was intended to do, for soon after each dose she vomited.

The physician requested the medicine to be sent to him, and it was brought to me with this question, "Is this Battley's liq. cinch. cordifoliæ?" I at once demonstrated to him that although the preparation looked like Battley's, the alkaloids had been divorced from their husbands or otherwise ill-treated with an acid, and that it was not Battley's preparation at all. Armed with this positive assertion, the physician went to the chemist who dispensed the prescription who, on being charged, at once admitted a "superior" preparation had been used.

I do not think Mr. Battley at all cared for bark so very rich in alkaloids to operate upon, but he gained his object, which was far better. The human stomach has a great objection to chemical refinements, and would much prefer dealing with the powdered bark in its own way if the dose were smaller. It is very difficult to give quinine with alkalies; liquor cinchonæ sides fairly well with them, and that is a very great desideratum.

Did Mr. Battley use potassium carbonate or sulphate in his process? I sometimes have a very strong impression he did. If a little of the liquor is evaporated the residue is remarkably hygroscopic, and darker than I can obtain. I confess I cannot approach Mr. Battley in dealing with bark. I wish I could, for it is a matter of vast importance that Pharmacopœia preparations should not be relegated in advanced pharmacies, as legal lumber to an unused cupboard.

George Mee.

Communications, Letters, etc., have been received from Messrs. Greenish, Lugar, Möller, Kirkby.

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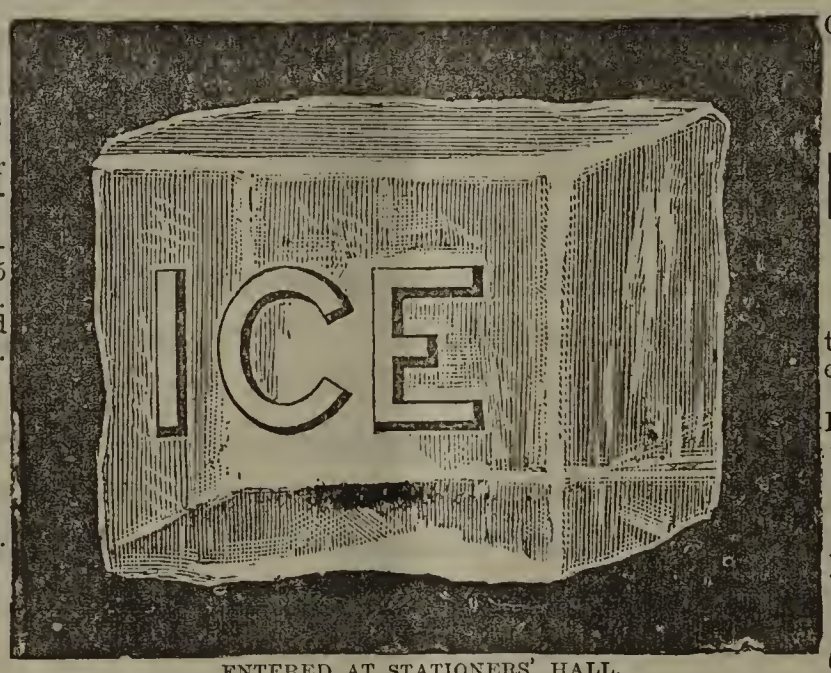

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 756.] SATURDAY, DECEMBER 20, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

	Page
The Disputed Identity of the Red Bark. By W. T. Thiselton Dyer, C.M.G., F.R.S.	481
Notes on Recent Donations to the Museum of the Pharmaceutical Society. By E. M. Holmes, F.L.S.	482
Amyl Nitris. By Dr. Squibb	483
Chemical Action of Light. By D. Amato	486
Plants used as Medicines in China	487
EDITORIAL ARTICLES AND NOTES:—	
Wöhler and Liebig	489
Notes:—Corn Plasters and the Stamp Act—The *Lancet* and the Local Government Board Report—The Sixth International Pharmaceutical Congress—The next British Medical Association Meeting—Accidental Poisonings	490
TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY:—	
Examinations in London	491
North British Branch:—	
Evening Meeting	491
The Estimation of Spirit of Nitrous Ether. By D. B. Dott, F.R.S.E.	492
The Estimation of the Oxides of Mercury. By M. Deehan and T. Maben	494
PROVINCIAL TRANSACTIONS:—	
Leeds Chemists' Association:—	
Remarks on Chinese Rhubarb. By W. Elborne	497
PARLIAMENTARY AND LAW PROCEEDINGS:—	
Poisoning by Chlorodyne	497
Attempted Suicide by Poisoning	498
An Amateur Medicine Dispenser	498
Attempt to Poison	499
OBITUARY	499
REVIEW:—	
Roberts's 'Notes on Materia Medica and Pharmacy'	500
CORRESPONDENCE:—	
The Local Government Board Report	500
Liquor Cinchonæ	500
Answers to Correspondents	500

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar

NOTICES.

LIBRARY AND MUSEUM.

SPECIAL NOTICE.

The Library and Museum will be closed from 2 p.m. on Wednesday, December 24th, until 9 a.m. on Monday, December 29th, and will not be open in the Evening from Monday, December 29th, to Thursday, January 1st, both dates inclusive.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

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Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

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MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

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INDEX TO ADVERTISEMENTS.

		Page
ALLEN & HANBURYS	Jujubes	11
ALLSWORTH, N.	Instructions in Pill Coating	23
APOLLINARIS CO. (Ld.)	Hunyadi Janos	14
APOLLINARIS CO. (Ld.)	International Health Exhibition Award	24
ASSISTANTS WANTED		21, 22
BENNETTE, H.	Chemists' Valuer	23
BOLE HALL MILL CO.	Surgical Bandage	17
BOND	Marking Ink Pedestal	10
BREHMER, A.	Folding Cardboard Boxes	15
BRETT, F. J.	Transfer Agency	23
BRITISH CHEMISTS' & DRUGGISTS' TRADING ASSOCIATION (Ld.)		7
BURGESS, WILLOWS AND FRANCIS	Wholesale Druggists	4
BURROUGHS, WELLCOME & CO.	New Improvements in Pharmacy	6
BUSH, W. J., & CO.	Essential Oils and Fruit Essences	12
BUSINESSES for DISPOSAL		22
CENTRAL SCHOOL of CHEMISTRY and PHARMACY		19
CHEMISTS' BALL (The)		3
CHRISTY, T., & CO.	Menthol Cones	17
CHURCHILL, J. & A.	Pharmacopœia of the British Skin Hospital	4
COWAN, W.	Vaccination Shields	10
DAVENPORT, J. T.	Collis Browne's Chlorodyne	8
DAWES, A.	Tutor	20
DINNEFORD & CO.	Fluid Magnesia	18
ENGAGEMENTS WANTED		20, 21
EVANS, LESCHER & WEBB. / EVANS, SONS & CO.	Savar's Cigarettes / Savaresse's Capsules	17 / 14
FINK, F., & CO.	Glycerine, &c.	17
FRY, J. S., & SONS	Malted Cocoa, &c.	10
GRADUATED COUNTY SCHOOLS ASSOCIATION (Ld.)		23
GRINDLEY & CO.	Petroleum Jelly	17
HAMPSON, R.	Sugar-Coated Pills	17
HARRIS, H., & CO.	Bottles	18
HEARN, RIDDELL & CO.	Bottles	5
HENRY, T. & W.	Calcined Magnesia	4
HODSON, J. C.	Mechanical Dentist	22
HOGE'S HONEY CO. (Ld.)	Horehound Honey	16
HOOPER, W., & CO.	Pulvis Jacobi	4
HUGHES, W.	Magic Lanterns	4
KAY BROTHERS	Coaguline, &c.	15
KEMP, W., & SON	Crushed Linseed, &c.	17
KILNER BROS.	Bottles	15
MACFARLAN, J. F., & CO.	Antiseptic Dressings, Chloroform, &c.	15
MANCHESTER COLLEGE of CHEMISTRY and PHARMACY		18
MAW, SON & THOMPSON	Earthenware Inhalers	13
MAW, SON & THOMPSON	Trade Notice	5
MENTHOL CONES DEPOT	Menthol Cones	11
MOTTERSHEAD & CO.	Benger's Preparations of Digestive Ferments	18
MUMFORD, G. S.	Crushed Linseed, &c., &c.	7
MURRAY, SIR JAS.	Fluid Magnesia	17
ORRIDGE & CO.	Transfer Agency	23
PAUL (KEGAN) TRENCH & CO.	Cooke's New Chemistry	4
PHARMACEUTICAL SOCIETY of GREAT BRITAIN	Official Notices	1
POWELL, T.	Balsam of Aniseed	16
PRICE'S PATENT CANDLE CO.	Glycerine	15
RANDALL & SON	Black Currant Lozenges	16
ROBINSON, G. H.	500 Practical Trade Receipts	4
SANFORD & SON	Rat and Mice Poison	17
SAUNDERS, J.	Private Tutor	19
SAVORY & MOORE	Pancreatic Emulsion	9
SCHOOL of PHARMACY of the PHARMACEUTICAL SOCIETY		2
SCHWEITZER, H., & CO.	Cocoatina	7
SILVERLOCK, H.	Almanacks	4
SMITH, BUTLER	Tutor	18
SOUTH LONDON SCHOOL of PHARMACY		18
SOUTHALL BROS. & BARCLAY	Sanitary Towels	18
SPRATT'S PATENT	Dog Medicines	5
SQUIRE	Chemical Food	9
STEINER & CO.	Vermin Paste, &c.	16
SYMES & CO.	Ol. Lavand. Rect.	14
TAYLOR, T. & F. J.	Aërated Waters	14
TERMS for ADVERTISEMENTS		20
THOMAS	Tincture of Steel	17
THOMPSON, H. A., & SON	Pharmaceutical Preparations and Chemicals	9
TOMLINSON, R.	Shop Fittings	22
TULLY, J.	Preliminary and Minor	19
TURNER, J. A.	Tamarind Emulsion	14
WALKER & DALRYMPLE	Chemists' Tea Agency	17
WANTED to PURCHASE		22
WARREN, A. & J.	Methylated Spirit	14
WESTMINSTER COLLEGE of CHEMISTRY and PHARMACY		19
WRIGHT, LAYMAN & UMNEY	Almond Essence	14
WRIGHT, LAYMAN & UMNEY	Essential Oil of Camphor	11
WRIGHT, W. V., & CO.	Liquor Carbonis Detergens	11

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NOTICE TO ADVERTISERS.

On account of the occurrence of Christmas Day in the ensuing week, the "Pharmaceutical Journal" will be published on Wednesday, the 24th inst. Advertisements must reach the Office not later than ten o'clock on

Tuesday morning, the 23rd inst.

The Office will be Closed from Wednesday Evening until Monday Morning, the 29th inst.

THE CHEMISTS'
NINETEENTH ANNUAL BALL
AT
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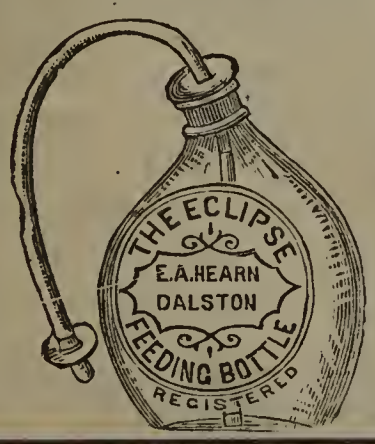

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Atropiæ Sulphas ....1-150 grain.	Strychniæ Sulphas ..1-100 grain.
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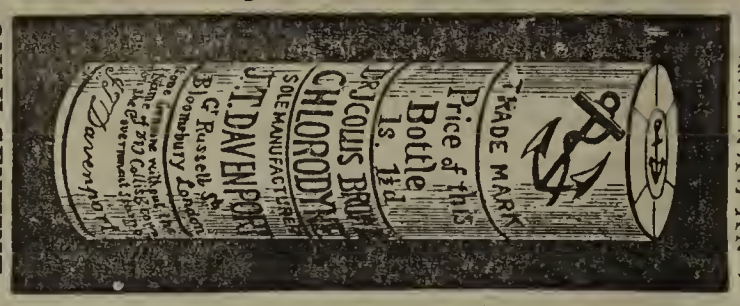

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This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

DIARRHŒA, DYSENTERY. GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient.

Dr. GIBBON, Army Medical Staff, Calcutta, states, "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

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To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia, the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

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IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

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Banks & Richards,	Birmingham.	Grattan & Co.	Belfast.	Parsons & Richardson,	Leicester.
Barron, Harveys & Co.	London.	Grimwade, Ridley,	London.	Peake, Allen & Co.	Dublin.
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The Emulsion is of the consistence of Devonshire cream, easily miscible with fluids, and quite unobjectionable in taste. It may be given in milk or water, and with the addition of a little wine or brandy if desired.

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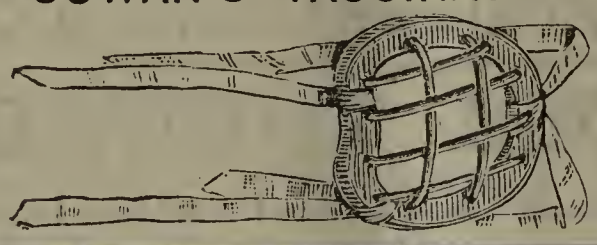

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From the *Lancet*, Dec. 22, 1866.

"In our hands it has been a most effective agent in skin diseases, especially of the chronic eczematous class; and one case of psoriasis, which had resisted all other kinds of treatment, speedily got well under the application of the *Liquor Carbonis Detergens*. We esteem it a very valuable addition to our list of skin remedies."

From the *Medical Times and Gazette*, January 19, 1867.

"We have more than once called attention to the value of this remedy in chronic eczema."

British Medical Journal, April 1, 1882:—"*Wright's Liquor Carbonis Detergens*. This is by no means a new preparation; for it has been in extensive use for many years. It is an alcoholic solution of coal tar, and is disinfectant of considerable value. Medicinally, it is often used for the destruction of pediculi, and as an external application in eczema, psoriasis, and other skin diseases."

The Practitioner of September, 1881, reports a lecture entitled "Recent Advances in the Therapeutics of Diseases of the Skin," by W. A. JAMIESON, Esq., M.D., F.R.C.P. Ed. The following is an abstract therefrom:—"Itching, which owes its origin to too slow a current of blood, of which the most typical example is that seen in *Eczema* connected with varicose veins of the leg—but to the same category also many examples of Pruritus Scroti, Labiorum and Ani may be referred—is best relieved by careful flannel bandaging, well applied suspensory bandages, and laxative salts or mineral waters, which unload the rectal veins by freeing the portal circulation, combined locally with *weak tarry lotions*, one of the best of which is *Wright's Liquor Carbonis Detergens*, a well made *alcoholic solution of Coal Tar*, suitably diluted."

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THE DISPUTED IDENTITY OF THE RED BARK OF THE NILGIRIS.

BY W. T. THISELTON DYER, C.M.G., F.R.S.,

Assistant Director, Royal Gardens, Kew.

I cannot but regret that Mr. Cross has reopened, in the pages of the *Pharmaceutical Journal*, a question which I imagine most persons interested in the subject had hoped had been finally laid to rest.

In 1880 Mr. Cross was employed by the India Office to take out to the Nilgiris the plants of Santa Fé and Carthagena barks which had been under his charge in the Royal Gardens, Kew. After successfully accomplishing this difficult task he remained in India for some time in charge of the plants.

Early in 1882 I received a letter from Mr. Clements Markham inclosing one from Mr. Cross, dated Government Gardens, Ootacamund, 21st January, 1882. From this I extract the following passage:—

"After the fullest and most careful examination of Neddivattum plantation I found that the most stupendous mistake that has ever occurred in the history of planters has been committed. The whole plantation, instead of consisting, as was believed, of pure succirubra, does not contain more than 5 per cent. of that species, the remaining 95 per cent. being of the grey bark or Huanuco sort, which, botanically, is either the *C. micrantha* or *C. peruviana*."

Mr. Cross subsequently wrote to Kew, March 21, 1882, to much the same effect.

The Government of Madras regarded Mr. Cross's statements as of sufficient importance to deserve careful investigation. Surgeon-Major Bidie, M.B., Superintendent of the Government Central Museum, Madras, was accordingly instructed to report upon them and to make a careful collection of specimens of every kind of cinchona grown at Naduvatum for transmission to Kew.

Surgeon-Major Bidie met Mr. Cross at the plantations, and with regard to the question raised he reported to his Government, March 3, 1882:—

"With reference to the assertion that the tree called by us *Cinchona succirubra* is a grey bark, *C. micrantha*, my first act was to show Mr. Cross exact reproductions of Fitch's plates of the two species* but without any names attached, and as he hesitated about giving an opinion as to which was the red bark, I did not then push the inquiry further. Subsequently, while collecting botanical and bark specimens, I was in daily intercourse with Mr. Cross, but found that he was immovable from his assumption that a mistake had been committed as regards the identity of the red bark tree.† I attach no importance to this however, for, notwithstanding his presumed familiarity with the botanical characters of the red bark, he took nearly a year to arrive at this conclusion and never even hinted at the possibility of such an error when in constant communication with a botanical expert like Colonel Beddome. In my opinion there can be no doubt that the tree known as the *Red bark* on the Government Plantations is the *Cinchona succirubra*, Pav., and it does not seem necessary to occupy the time of Government in offering proofs that such is the case, although for my own satisfaction I went carefully through all the botanical evidence on the subject."

The Governor of Madras, Mr. Grant Duff, himself no mean botanist, had previously looked into the matter personally. I quote the official minute in which he records his own opinion:—

Minute by the Right Honourable the Governor, dated January 26, 1882.

* * *

"Para. 9. From Ootacamund I went on to Neddiwuttum, where Dr. Bidie was established, busily engaged in examining our plantations with Mr. Cross and making a most complete collection of all those specimens which would be required for finally setting to rest the doubts as to the genuineness of our *succirubra* with which Mr. Cross fluttered us a few weeks ago. Colonel Jago was most anxious that Mr. Cross should have the fullest opportunity of stating his views to me, untrammelled by the presence of a third person. We went accordingly alone into the woods together, and he pointed out to me what he called 'true *succirubra*,' 'succirubra of the Pata variety,' and 'micrantha.' Colonel Jago then joined us and we went together to one of the trees, which our people have hitherto believed to be *micrantha*, and read the description of the tree under its branches. Most unquestionably the tree that we have hitherto called *micrantha*, and not the tree which Mr. Cross has now taken it into his head to call *micrantha*, is the *micrantha* of the books; that is, the *micrantha* heretofore known to botanists. The distinctions between it and any form of *succirubra* are most clearly marked, and are infinitely wider than the distinction between the two varieties of succirubra, one of which, Mr. Cross, who never was, I believe, in the micrantha country, which lies far to the south of the district which he knows so well, has recently christened *micrantha*.

"10. I left our plantations with no shadow of doubt upon my mind, and wish all botanical questions were as easy. I may add, too, that I, on more than one occasion, introduced the subject while in the Wynaad, with a view to seeing whether Mr. Cross's doubts had created any alarm among the planters; but I found them treated, on all hands, as illusions."

* * *

At Kew we had exceptional opportunities for testing immediately the accuracy of Mr. Cross's statements. Colonel Beddome had sent us a splendid set of dried specimens of every cinchona form grown in the Nilgiris, on which we reported early in 1882. Besides these we possess in the case of *C. micrantha* authentic specimens of the South American plant collected by Weddell and by Pritchett, in addition to what is presumably a type from Ruiz and Pavon's herbarium. Besides abundance of Indian specimens we have one in particular known to have been raised at Ootacamund from Pritchett's seeds, and the accurate determination of which has been verified by Howard. In the case of *C. succirubra* we have Spruce and Cross's own specimens from the slopes of Chimborazo and a specimen, presumably from Ruiz and Pavon's herbarium, verified by Howard. Colonel Beddome's admirable specimens were carefully examined by my colleague, Professor Oliver, the Keeper of the Kew Herbarium, and he found no reason to doubt that the species of *Cinchona* which passed as *micrantha* and *succirubra* on the Nilgiris were what they professed to be. Dr. Trimen, the Director of the Royal Botanical Gardens, Ceylon, also examined them (together with the further set collected by Dr. Bidie) with me while he was at home on leave in 1882, and we could see our way to no other conclusion.

* From Howard's 'Nueva Quinologia of Pavon.'

† His Excellency the Governor on his visit to the estates at once saw Mr. Cross's error and pointed it out to him but he still adhered pertinaciously to his assertion.

Finally, Dr. Trimen, at the invitation of the Madras Government visited their cinchona plantations in 1883, and reported upon them.

What he says on the subject of the red bark may be taken as the last word in the matter:—

"*C. succirubra*, Pav.—In regard to red bark I can very confidently endorse the opinions expressed by all the botanists who have examined the matter, that the well-known tree which forms the bulk of Naduvatam is the true *C. succirubra*, Pav. I have examined Pavon's own specimens in the British Museum, which precisely correspond with the ordinary red bark of India, Ceylon, and Jamaica."

Mr. Cross has further expressed the opinion, in which he has received more independent support than in the other case, that the hybrid form commonly met with in our Indian plantations, and now generally known as *Cinchona robusta*, is identical with the *Pata de Gallinazo* of Chimborazo.

In this identification I equally disagree with him. As the investigation of the matter led to a good deal of correspondence, I cannot do better than quote the passage from the Kew Report for 1882 (pp. 38, 39), in which the net result of the whole discussion is briefly summarized by Sir Joseph Hooker:—

"*Cinchona robusta*.—In the Kew Report for 1881, pp. 25, 26, I referred to the hybrid between *succirubra* and *officinalis*, which seems in the east first to have made its appearance in Ceylon, and thence to have been introduced by seed into the Sikkim plantations.

"This form has, during 1882, given rise to a rather protracted correspondence with the Madras Government. Mr. Cross, who was employed by the India Office to convey the Columbian barks from Kew to Southern India, insisted that the two supposed hybrid forms grown on the Nilgiris, under the names of *pubescens* and *magnifolia*, were not hybrids but distinct species, of which the seed had been sent by himself from the slopes of Chimborazo. After some shifting of opinion he seems finally to have settled down to the statement that *magnifolia* was the *Cinchona*, called in the Chimborazo bark district 'Pata de Gallinazo,' that *pubescens* was true *succirubra*, and that the *succirubra* of the Madras plantations was *micrantha* (Grey bark).

"In all these identifications his recollections of plants seen no less than twenty years before seem to have misled him. Unfortunately, his views were, to a certain extent, adopted by the eminent quinologist, Mr. Howard, and it therefore became necessary to critically examine them, as such gigantic errors in nomenclature could not but very seriously affect the future policy of administration of the Madras cinchona plantations.

"Under instructions from the Madras Government, very copious and carefully prepared sets of all the Cinchonas cultivated in the Nilgiris were despatched to Kew, both by Colonel Beddome and by Surgeon-Major Bidie, the Superintendent of the Madras Central Museum. They were very thoroughly examined, and there appeared no valid reason for disputing the accepted names under which the plants had been grown or for adopting those assigned to them by Mr. Cross.

"The authentic specimens of the Pata de Gallinazo, collected by Spruce, and described by him in his official report, are preserved in the Kew Herbarium. They have been subsequently identified at Kew by Spruce (confirmed by Howard) with *C. erythrantha*, Pav., and Triana, the most recent monographer of the genus, has referred this species as well as Spruce's specimen to *C. pubescens*, Vahl. Neither the *magnifolia* nor *pubescens* of the Nilgiri plantations can in any way be confounded with *Cinchona pubescens*, Vahl, but are, no doubt, as has always been contended, marked members of the variable series of hybrids which appear to invariably arise in plantations where *officinalis* and *succirubra* are cultivated in proximity.

"Mr. Cross's other two conclusions proved equally baseless. As, however, these questions of synonymy had excited a good deal of perplexity in Ceylon as well as in Southern India, I suggested to the Government of Madras that Dr. Trimen, the Director of the Royal Botanic Garden, Peradeniya, should be invited to visit the Cinchona plantations of the Madras Government, in order to bring about if possible some uniformity of nomenclature in the forms and species of Cinchona cultivated both in Ceylon and Madras. This he accordingly did, and he has given the results of his exhaustive study of the whole question in a very able and lucid report (dated June 30, 1883), which, representing, as it also does, the opinions arrived at by the Kew staff, appears to me to finally dispose of the whole subject. Both the names *pubescens* and *magnifolia* Dr. Trimen, for reasons which he gives, proposes to discard in favour of *robusta* which is in use on some estates in India, and 'is now commonly employed in Ceylon for the trees in question.' Dr. Trimen describes those he saw on the Nilgiris in the following words:—'I found the forms to be just those so common in Ceylon plantations. Generally robust well-grown trees, larger, hardier, and healthier than either the *officinalis* or *succirubra*, among which they were scattered, and often flourishing where neither of them can thrive. Botanically, there was the same range of variety, the extreme form in one direction, with its dark green smoothly shining leaves, closely approaching some of the large-leafed forms of *C. officinalis*; and that in the other direction with its larger, paler, thinner leaves more or less pubescent beneath, so close to the hairy form of *C. succirubra* as to be often with difficulty distinguished from it. Between these, as regards colour and pubescence, were many intermediates, though, undoubtedly, with a little ingenuity, the whole can be thrown into two groups.'

"He further adds:—'We have direct testimony of its origin. I am assured by planters of credit that they have grown both glabrous and pubescent *robusta* from seed of ordinary *officinalis*, and that it is by no means unfrequent for seedlings of them to appear in seed-beds on estates where no trees but *officinalis* and *succirubra* occur. I have myself seen seedlings of *robusta* self-sown where there are no parent trees of the sort whence they could have been derived; and at one time I was inclined to regard it merely as a variety of *officinalis*. There are I think, grounds for believing that *succirubra* generally supplies the pollen, and is, therefore, the male parent, both in the case of *robusta* (*succirubra* and *officinalis*) and *anglica* (*succirubra* and *Calisaya*).'"

NOTES ON RECENT DONATIONS TO THE MUSEUM OF THE PHARMACEUTICAL SOCIETY.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

(*Continued from p.* 41.)

RASAMALAS.

Regarding the specimens of this drug presented to the Museum, Mr. Jamie's remarks seem to confirm Hanbury's statements, that this liquid storax is not obtained from the Rasamala tree (*Liquidambar altingiana*, DC.; but is an imported article. Mr. Jamie states:—"My belief is that the black and white Rasamalas, as sold here amongst the Javanese, are identical, and that the black is coloured for the market. I doubt very much indeed if any at all is produced in Java and all that is found here, and in Java itself, is imported from Bombay and from thence exported to Java. I do not see why it

should not be collected in Java or some of the neighbouring islands."

"I applied to our Export and Import Office for information, and copy out the reply I received:—

"'Rasamala is imported from Arabia and Persia and is valued at 30 dollars per picul (133⅓ pounds). Imported under the head of medicine. It is used for scenting clothes and rampah-rampah (this double word meaning spiceries), and for rubbing over the body. It is also largely used for swollen testicles by the natives. The article is imported largely to Java, in fact mostly. The Javanese, Arabs and Klings use plenty of Rasamala.'"

ESSENTIAL OIL OF BALSAM OF PERU PODS.

This has been distilled from the pods of a tree of *Myroxylon Pereiræ*, grown in Mr. J. Fisher's garden, with a view of ascertaining whether the oil can be used in medicine or commerce. The tree from which the fruits were obtained was sent to Mr. Fisher by Sir Joseph Hooker, several years ago.

The oil is almost colourless, with a sweet odour that recalls the fragrance of a field of beans in blossom. By exposure to air the odour becomes slightly altered, probably by oxidation of the oil, and approaches that of cedar wood. The oil is not entirely soluble in rectified spirit, a white precipitate settling down after a few days and leaving the supernatant liquid quite clear. The odour is so different from that of either balsam of Tolu or balsam of Peru that the chemistry of the oil might be worth investigation. It seems well fitted for use in perfumery, as it is not exactly like any known perfume.

NGAI CAMPHOR.

The specimen sent by Dr. Jamie is not entirely freed from the oil, and is therefore in a different condition and has a different odour to the pure crystals in the Hanbury Collection. The odour, which is due to the volatile oil, is very agreeable, resembling a mixture of roses and rosemary.

The camphor has already been described by Messrs. Hanbury and S. Plowman in this Journal ([3], vol. iv., pp. 709, 710, 722).

ABRUS PRECATORIUS.

Mr. Boverton Redwood has kindly furnished the following information concerning the poisonous spikes or "sui," which he recently presented to the Museum:—

"The suis are prepared from the seeds of *Abrus precatorius* in the following manner:—The shell of the seed is removed, the seed softened in water and pounded into a paste, which is then rolled out into little cylinders about ¾ inch long, sharpened at one end. After careful drying the cylinders are further pointed by being rubbed on a brick, and are finally soaked in animal fat. The suis are fitted for use into a wooden handle from which the point just protrudes. Upon a blow being struck with this weapon the point of the sui penetrates the flesh, the sui being drawn out of the handle into which it is loosely fitted and remaining in the wound.

"Suis appear to have been first used for poisoning cattle in the Punjab, but of recent years many cases of suspected sui poisoning have occurred in Bengal. The practice is resorted to by natives of the Skinner caste, their object being to obtain the skins of the cattle. Death ensues on an average in forty-eight hours.

"The seeds and suis have been chemically examined, and their physiological effects carefully determined by Dr. Warden, Professor of Chemistry in the Calcutta Medical College, and his results and conclusions were published in the *Indian Medical Gazette* (*Pharm. Journ.*, [3], xiii., 684). I had some conversation on the subject with Dr. Warden when I was in Calcutta about a year ago, and he gave me the specimen which has been handed to you."

Since the specimens of sui were received from Mr. Boverton Redwood, seeds of the *Abrus precatorius* of white, yellowish and black colour have been received from the Indian Department of the International Forestry Exhibition, and of a brown colour from the British Guiana Department.

KARA KALILEH.

This Turkish drug consists of the dried immature fruits of the *Terminalia Chebula*, or black myrobalans of old writers. They are shrivelled, black, hard, from ⅓ to ¾ of an inch long, with a shining fracture and very astringent taste. Mr. Dickson, who sent the Kara kalileh from Constantinople, and whose remarks Mr. C. B. Allen kindly permitted me to see, says of it:—"It is a mild tonic laxative in great repute among the Mecca pilgrims, probably because the hadjis tell them that the Prophet praised its virtues. It should be broken up into a coarse powder and swallowed. I have had it ground down into powder and taken a drachm of it; it had a ligneous bitterish flavour, and acted as a very mild laxative."

The Indian Pharmacopœia has the following statement (p. 89) with regard to the myrobalans:—"Their virtues are highly extolled by Rajah Kalikissen (*Calcutta Med. Phys. Trans.*, vol. v., p. 432), who regards them as combining mild purgative with carminative and tonic properties. Twining ('Diseases of Bengal,' vol. i., p. 407) speaks very favourably of them in the same character, and expresses his surprise that a medicine with such useful properties should be so little employed in various forms of cachexia in Europe. He gives a case of enlargement of the spleen, in which it was productive of good effects."

AMYL NITRIS.*

NITRITE OF AMYL.

BY DR. SQUIBB.

The nitrite of amyl used in medicine under this title does not seem to be the simple substance known as such to chemists, but is a rather complex mixture or compound of loose molecular structure, and varying considerably with the processes used for obtaining it. It is very much like spirit of nitrous ether in this respect, and therefore to be uniform it should be the product of a uniform process and management.

The best of several processes tried by the writer, and the one which has now been in successful use for many years, is the counterpart of the process for spirit of nitrous ether, and was suggested by, and based upon that process. It is by the direct action of nitric acid upon amylic alcohol, under the conditions of a well regulated temperature.

The apparatus for making it consists of a wide neck distilling flask, fitted with a rubber stopper, with one large and two small glass tubes. One small tube for supplying the acid and the alcohol in a continuous stream as the distillation proceeds. The large tube for the passage of the vapour to the condenser, and the other small tube for the passage back into the flask of th

* From *Ephemeris*, November, 1884.

amylic alcohol condensed from the mixed vapours by the lower hot condensers. This flask is set in a glycerin-bath, heated by a steam coil from the common steam boiler. The vapour tube of the flask is connected to the upper one of two Liebig's condensers made with glass tubing in iron cases. From the end of the second of these condensers the vapour tube rises perpendicularly, without a case, to the upper one of another similar pair of condensers. From the lowest point of this upright tube, where it is connected to, and continuous with the condenser tube, passes off a small tube which takes the liquid that is condensed by the lower condensers and the upright tube back to the distilling flask by the small tube in the stopper before mentioned. This small glass tube from the lower condensers back to the flask is bent into a U trap, so that no vapour can pass out by it, but only liquid into the flask. The upper pair of condensers terminate in an open extremity from which the condensed liquid flows into a receiver. The cases of the lower pair of condensers are supplied with steam from the boiler, and are always kept steam-hot. The cases of the upper pair are supplied with cold water. Two bottles, whose joint capacity is about equal to that of the distilling flask, are fitted with corks through which small syphons pass to the bottoms, and small air tubes for charging the syphons. These bottles are placed upon a shelf or support elevated three or four feet above the distilling flask, and the two outer ends of the syphons are connected with a Y tube by short pieces of rubber tubing, each furnished with a screw pinch cock. The lower single tube of the Y is continued down and connected with the charging tube of the stopper in the distilling flask. By this arrangement the contents of the two supply bottles can be run into the distilling flask in any quantity and at any desired rate, and the contents can be run in separately or together. In the writer's apparatus these are 9 pint bottles, and hold about a day's work for the two gallon distilling flask. One of the bottles is filled with a dilution of 9 parts officinal nitric acid and 1 part of distilled water, and the other is filled with 8 parts of well purified amylic alcohol, boiling at about 132° C. = 269·6° F. A mixture, of about one-eighth of the capacity of the distilling flask, is made in it over night, consisting of 1 part of the diluted nitric acid and 2 parts amylic alcohol, and this serves to start the process. In the morning the glycerin-bath is heated up until the desired reaction takes place in the flask, and when the boiling becomes active the heat is kept very steady and the feeding in from the bottles is begun, so regulating the current that about 2 parts amylic alcohol to 1 part nitric acid flow steadily in at a rate a little more rapid than the distillation. The more volatile products formed by the reaction carry over to the condensers with them a very considerable proportion of undecomposed amylic alcohol, and other products of higher boiling points, such as nitrate of amyl. The lower pair of condensers, which are kept steam-hot, condense a very large proportion of these substances of higher boiling points, and the liquids are drained back into the flask through the small trapped tube provided for the purpose, while the substances of lower boiling points, such as the nitrite of amyl, aldehyde, etc., are not condensed by the lower condensers, but rise through the upright tube to the upper pair of condensers, and are there condensed by the cold water and run into the receiver. This is the crude nitrite of amyl, and when it has accumulated in any convenient quantity it is well washed by active agitation and digestion upon a solution of crystallized carbonate of sodium, 1 part to 5 of water. It is then returned to the distilling flask and rectified. In the rectification not more than one-third to one-half can be got over with the steam heat of the bath, and the remainder is mainly amylic alcohol. When the rectified nitrite of amyl ceases to come over, the receiver is changed and nitric acid is run into the flask from the bottle until this residue of amylic alcohol is reduced to about one-half, when fresh alcohol is again run in with the acid and the process carried on as before, until another portion of the crude nitrite is obtained for washing and rectification. The bottles containing the accumulated rectified product are then set out of doors in winter, or in an ice-bath in summer, when in about twelve hours the dissolved water will be precipitated out and may be easily separated.

This apparatus and process yields an excellent medicinal product which has now been largely used for more than ten years past, but it is not free from the accidental products of the reaction, and does not agree well with the Pharmacopœia description nor answer to the potassa test. So far as can be ascertained by the writer, three manufacturers of nitrite of amyl supply nearly or quite all that is sold in this market. Two of these makers are domestic and one foreign. That of foreign make is imported in sealed glass tubes of one ounce each, and this is the only practicable way yet devised of handling the liquid without serious loss. But the sealed tube has some rather serious disadvantages which prevent this writer, and perhaps other makers, from adopting it. In opening the tubes skilful management is required, and even with the greatest care there will be some loss and some little danger. The diffusibility, or vapour tension, of the liquid is so great that a very considerable pressure is generated in the tubes, and it is this pressure which causes the difficulty. The best way of opening them was found to be, after chilling them well for ten minutes in ice-water, as follows:—The tube should be held in a towel so that in case it breaks the glass will not cut the hand or fly in the face The neck of the small projecting part of the tube is laid against the edge of a table and is nicked with a sharp file opposite to the edge. Then a smart tap with the file, outside the neck, breaks off the little nipple. In doing this the tube should not be pointed toward a window, or a person, because the little piece of glass flies off with an explosion and often with force enough to break a window. In one tube out of seventeen, in the writer's hands, the glass went all into small pieces, and cut the hand which held it, in two or three places, thus suggesting the necessity for wrapping with a towel, and of the use of an ice-water bath. Another of the tubes would certainly have gone in the same way but for the ice-water bath. When the nipple is off a very small opening is left, through which it is quite difficult to empty the tube. The best way to get the liquid out is perhaps to pass a long platinum wire through the opening, and inverting the tube over a narrow beaker, churn it up and down until empty. The device of wrapping the tube in a cloth wrung out of hot water was not tried. Some three hours' time was required in emptying seventeen one ounce tubes, and the loss was about 2 ounces. It therefore appears that stoppered vials are the best means of transporting the liquid, although the loss by them is much greater through gradual leakage of vapour, with the best possible stoppering.

The product of the other two manufacturers is put up in 1 ounce ground stoppered vials, and from the great difficulty in getting stoppers ground in large quantities so as to retain this liquid the vials are occasionally found empty after transportation, and are often found only partly full. Indeed it is doubtful whether any glass stopper can be made to hold the liquid perfectly, so that after long transportation, especially in summer time, every single vial will be found somewhat short, but a few with a larger shortage than others. As a rule it should never be ordered for any long transportation in summer, and those who cannot foresee their wants sufficiently to avoid such transportation should bear the losses that occur through this want of foresight. It is neither a very difficult nor costly substance to make as found in the markets, and could be sold at much lower price were it not for the cost of stoppering the vials, and of making good the losses when the bottles reach their destination empty. Lately, by extraordinary care in grinding the stoppers, and by the use of a very minute quantity of

soft white paraffin on each, the losses have been reduced somewhat, and the stoppers made rather easier to get out. Of all liquids it is perhaps the most difficult to transport without loss. No material except glass will answer for it, and the vapour which stands over the liquid has such a tendency to decompose that, in common with spirit of nitrous ether, it acts upon cork very speedily. However well stoppered, any package of the vials is almost sure to give the odour, and any packing box containing a package of the vials, will, after transportation, give the odour, even when the leakage is at its minimum. It is very rare indeed that the liquid leaks out, and even when bottles reach their destination empty there is usually no staining of the wrappers, and the bottles appear as though put up empty. Therefore, when bottles are transported upside down, as must frequently be the case, when the pressure generated can only push the liquid out instead of the vapour, it must escape so slowly as to evaporate as fast as it gets through. It is in consideration of these characteristics that the Pharmacopœia wisely directs it to be kept in glass-stoppered bottles in a cool, dark place, and when thus cared for it keeps indefinitely.

In the examination of the products of the three manufacturers who have so long supplied the chief, if not the entire, demand for this substance in the U.S. market, the results are given in the supposed order of the quantities sold. That is, the nitrite of amyl supposed to be sold in much the largest quantity is called No. 1. That sold in the next largest quantity No. 2, and that sold in smallest quantity No. 3, and the prices at which they are sold differ by about 4 cents an ounce. One of the makers, namely, this writer, puts up fluid ounces, while the other two put up avoirdupois ounces by weight, and thus give nearly $1\frac{1}{8}$ fluid ounces, or over 10 p.c. more to start with.

No. 1 was a pale yellow colour, hardly deep enough for straw colour.

No. 2 was a full yellow, too deep for straw colour, and yet hardly a deep golden yellow.

No. 3 was hardly distinguishable from No. 2, in either kind or depth of colour; a shade or two lighter perhaps when seen in quantity of 500 c.c.

All were faintly acid to neutral litmus paper when looked at while the paper was immersed, the reaction becoming more acid on exposure to the air. But No. 1 was most acid and No. 3 least so.

When 5 c.c. of each was exposed on a watch-glass, the watch-glasses standing side by side, at the end of six hours No. 1 had a considerable residue of liquid, No. 3 a much smaller quantity, while in the case of No. 2 the glass was merely greasy.

The apparent sp. gr. of No. 1 at 4° C. compared with water at 4° C. was ·8572.

The apparent sp. gr. of No. 1 at 15° C. compared with water at 15° C. was ·8487.

The apparent sp. gr. of No. 1 at 15·6° C. compared with with water at 15·6° C. was ·8483.

The apparent sp. gr. of No. 1 at 25° C. compared with water at 15° C. was ·8405.

The apparent sp. gr. of No. 2 at 4° C. compared with water at 4° C. was ·8904.

The apparent sp. gr. of No. 2 at 15° C. compared with water at 15° C. was ·8794.

The apparent sp. gr. of No. 2 at 15·6° C. compared with water at 15·6° C. was ·8788.

The apparent sp. gr. of No. 2 at 25° C. compared with water at 15° C. was ·8691.

The apparent sp. gr. of No. 3 at 4° C. compared with water at 4° C. was ·8915.

The apparent sp. gr. of No. 3 at 15° C. compared with water at 15° C. was ·8809.

The apparent sp. gr. of No. 3 at 15·6° C. compared with water at 15·6° C. was ·8803.

The apparent sp. gr. of No. 3 at 25° C. compared with water at 15° C. was ·8707.

At 15° C., they were respectively, ·8487, ·8794, and ·8809. From these results, when taken in connection with what follows, it will be seen that specific gravity, although a useful guide, is not an indication of quality which can be relied on when taken alone, since No. 2 is better than No. 3, although slightly lower in specific gravity. By far the most common contamination, as in No. 1, is unchanged amylic alcohol, and as this has at 15° C. a sp. gr. of about ·815, and a boiling point of 132° C., it follows that the more of the alcohol present, the lower will be the sp. gr. The next most common contamination is likely to be nitrate of amyl, sp. gr. about ·998 to 1·000, boiling at about 148° C., and the presence of this would have the contrary effect of increasing the sp. gr., while admixture of the two contaminations would yield intermediate sp. gr., and thus make sp. gr. an uncertain test when the boiling points by fractional distillation be not also taken.

When all the specimens were contained in 1 ounce vials equally filled, and of about the same size at the mouth, if one nostril was applied and the other stopped and a moderately full inspiration taken, they all gave the characteristic sensation of fulness of the head within a few moments, but No. 1 gave decidedly less fulness than the others. From a half inspiration, the fulness from No. 1 was still perceptible, while from No. 2 it was quite strong, and from No. 3 slightly weaker. When still less of the vapour was inhaled there was no effect from No. 1, while the others were very distinct, but No. 3 less strong than No. 2. In these trials ten to fifteen minutes' time was allowed between each, for the effects to go entirely off. As a result of the trials it was estimated that one-fourth of an inspiration from No. 2 was equal to a moderately full inspiration of No. 1, and that No. 3 gave about three-fourths of the effect of No. 2. No. 1 gave an inclination to cough, very similar to that given on smelling amylic alcohol, the others giving this tendency in a smaller degree, or generally not at all.

In testing these products by fractional distillation it was found that satisfactory results could not be obtained from small quantities, and therefore 500 c.c. of each was taken for parallel distillations. These were made from an ordinary glass retort, the tubulure of which was fitted with a good thermometer, with the bulb as near as practicable to the bottom. The heat was applied by a bath of diluted glycerin. The retort was connected to a good Liebig's condenser by rubber connections, and the lower end of the condenser was reduced in size so as to be always closed by the drops of liquid and so as to pass inside of the receiving vials. The distillate was received in fractions of 5 to 6·5 per cent. of the original quantity, and the distillations were conducted as nearly as possible alike in every way. All had the appearance of boiling before real ebullition began, but it was easy to see when condensable vapour was produced, and from this point the boiling in each case was uniform and steady throughout. After the distillation commenced there was apparently no uncondensable gas or vapour produced.

The results of the fractionating were as follows:—

	Began to boil at	Began to distil at	Per cent. of distillate over at 95° C.	Per cent. of distillate over at 98° C.	Per cent. of distillate over at 100° C.	Per cent. of distillate over at 105° C.	Per cent. of distillate over at 110° C.	Per cent. of distillate over at 120° C.	Per cent. of distillate over at 136° C.	Per cent. of residue in retort at the close.
No. 1 . . .	87° C.	89° C.	6·6	—	—	13·2	19·2	35·8	86·0	10·4
No. 2 . . .	61° C.	85° C.	19·2	34·4	45·6	66·6	77·8	84·4	*90·2	7·6
No. 3 . . .	63° C.	93° C.	—	2·0	5·0	33·4	57·4	81·2	89·2	6·8

* The temperature in the distillation of No. 2 never rose above 123° C.

The above given percentages are all by volume, and the difference between the sum of the last two columns and 100 is the loss in distilling.

Now when it is remembered that amylic alcohol boils at about 132° C., and that the reaction between this alcohol and nitric acid under the prescribed conditions yields chiefly nitrite of amyl, boiling at about 96° C., but also an aldehyde boiling at about 21° C., and nitrate of amyl boiling at about 148° C.,—the results of the fractioning will be understood. Most authorities describe nitrite of amyl as though it distilled with a constant boiling point; W. Hofmann, however, as quoted by Gmelin, vol. xi., p. 63, says that it begins to boil at 90° C., the boiling point rising slowly to 110° C., and then more quickly to 200° C. And Allen, 'Commercial Organic Analysis,' 1879, vol. i., p. 160, says when submitted to fractional distillation at least 80 per cent. of a good sample will pass over between 90° and 100° C. This having no fixed boiling point, seems to indicate a substance of loose composition which easily splits up under the effects of heat, and probably reunites on cooling.

In the fractionating of sample No. 2 about 5 per cent. of the original quantity came over for each rise of 1° C. in the boiling point, between 94° and 104° C., the fractions being larger at first and smaller towards 104°.

Then they gradually decreased to 4 per cent., 3 per cent., 2 per cent. and 1 per cent. for each rise of 1° C., and the boiling point did not go beyond 128° C. when the distillation was stopped with the thermometer bulb only about half immersed and about 38 c.c. left in the retort. But only about 46 per cent. of this specimen came over below 100° C.

On comparing the sixteen fractions of this distillation there was but little difference in colour throughout, the residue from the retort being nearly as deep a yellow as the first fractions, but not quite as deep. All were of a full yellow and not pale yellow. The difference in odour and in effect was greater than in colour. No difference was perceptible between the first ten of the fractions, and even in the next four the difference was slight. The last or fifteenth distillate gave the characteristic sensation in the head from a half inspiration and did not produce cough. But the sixteenth fraction or the residue from the retort gave but a faint sensation in the head, and produced the cough which is characteristic of smelling amylic alcohol.

From these observations it seems very probable that the splitting of the nitrite begins at the first boiling point and continues throughout, and that the result is a compound which contains less amylic alcohol, and from having a lower boiling point distils over, leaving a compound of more amylic alcohol and higher boiling point which remains behind. This is evidently what occurs on exposure in a watch-glass, when the residue is very much like that from the retort. It is probable, therefore, that this specimen, No. 2, was nearly all nitrite of amyl at the start, the proportion of partially combined, or loosely combined amylic alcohol being less than 10 per cent., and the proportion of nitrate of amyl less than 5 per cent., while the aldehyde must have been in very small proportion indeed.

The specimen No. 3 seemed very much like No. 2, though yielding very different results upon distillation. Only about 5 per cent. of this specimen came over below 100° C., or less than 1 per cent. for each rise of 1° C. But between 100° and 105° C. about 28 per cent. more came over, or about 5·5 per cent. for each rise of 1°. And only about 57 per cent. came over below 110°. At 120° there was over about 81 per cent., or only about 3 per cent. less than from No. 2 at this temperature, but the next fraction and the residue had much higher boiling points than No. 2.

(*To be continued.*)

CHEMICAL ACTION OF LIGHT.*

BY D. AMATO.

The author has long held the opinion that many reactions which are said to take place through the direct action of light are not due entirely to that cause, but that light acts only under certain determinate conditions of temperature; consequently, there are limits of temperature within which light does not act in this way. In support of this opinion, the author has made numerous experiments, which are given in detail in the paper.

It is usually stated in text-books that light acts on liquid hydrogen phosphide, and decomposes it into solid and gaseous hydrogen phosphides. The author found, however, that inflammable gaseous hydrogen phosphide (containing liquid phosphide) loses its property of taking fire spontaneously on contact with the air, if kept over water *in the dark* for twenty-four hours at a temperature of 10° to 12°, whilst the same gas confined over mercury remains unchanged. It was proved that this decomposition is due to the oxygen dissolved in the water. At a temperature of 29°, and exposed to diffused light, gas confined over mercury was decomposed with deposition of solid hydrogen phosphide, whilst the same gas, if kept at 10°, was not decomposed, even when exposed to the brilliant July sunlight of Italy. In another experiment, in which the gas was exposed to the full heat of the sun (39°), whilst the light was completely excluded by a black varnish (made with glue and lampblack), the gas was not acted on. From this it would seem that neither the most brilliant sunshine (at temperatures below 10°) or heating to a temperature of 39°, are individually incapable of effecting the decomposition of liquid hydrogen phosphide, but this takes place readily by the joint action of sunlight and heat.

Similar experiments were made with a mixture of chlorine and hydrogen, and it was found that, if cooled to −12°, it could be exposed to the direct rays of the sun for hours without combination taking place. Care, however, must be taken that the chlorine is not exposed to the sun's rays even for an instant *before cooling*, as isolation renders chlorine capable of combining with hydrogen even in the dark. At a temperature of 39°, there is no action if light is excluded.

Silver chloride, if cooled to −12°, is not acted on by the direct solar rays, but if allowed to get warm, decomposition begins immediately. Paternò has also observed that chlorine and ethylene do not combine in diffused light if the temperature is low, or only very slowly.

Another substance which is usually supposed to undergo decomposition on exposure to light is Fehling's test. The author finds, however, that this change is due to dust from the atmosphere, and the fact of keeping the bottle containing the solution wrapped up in paper and in a cupboard preserves it, merely inasmuch as it keeps it comparatively free from dust. If the solution be boiled in a narrow-necked flask for some hours, and after being allowed to settle, the clear liquor is decanted into a clean well-stoppered bottle, it may be exposed for any length of time to the direct rays of the sun without undergoing any change. In order to ensure success, the bottle should be rinsed out successively with permanganate solution and distilled water before introducing the Fehling's test. In order to prove that the dust in the air is the cause of decomposition, two samples prepared as above were taken, and through one of them a current of air from the laboratory was passed previously to closing the bottle. After exposure to light for a year, cuprous oxide was deposited in the solution contaminated with dust from the air, whilst the other remained unchanged.

The author has also noticed that solutions prepared in the ordinary way, after being kept for some time—a year or more—yield an abundant deposit of cuprous oxide if cautiously neutralized with sulphuric acid, and this even in the cold, but more readily when heated. A

* From *Gazzetta*, xiv., 57–72. Reprinted from the *Journal of the Chemical Society*, December, 1884.

solution recently prepared, or one treated in the manner above described, does not behave in this way.

From these experiments the author concludes that—at all events for the substances above mentioned—light acts only under certain conditions as to temperature, and heat only under the influence of light, and that neither of them acts in the absence of the other.

PLANTS USED AS MEDICINES IN CHINA.

In an appendix to a Report on the Trade of Ichang for the year 1883, Mr. Consul Gardner has given lists of the animal, mineral and vegetable products of the Ichang Consular District, and mentions the uses to which many of them are put. The following are the plants referred to as being used for medicinal purposes:—

Aconite. The roots of various aconites are used as heroic remedies. I know of three varieties produced in this district—(1) *Aconitum sinense* (monk's-hood); (2) *Aconitum Lycoctonum* (wolf's-bane); (3) *Aconitum variegatum.*

Acorus. One variety is used as a tonic, and the root of another as a nutritive.

Adenophora verticillata. The root of this campanulaceous plant is supposed to have the restorative effects of ginseng.

Ailanthus glandulosa. The leaves of this plant are used as an astringent.

Amarantus (Love lies bleeding) is eaten as a vegetable. *Amarantus olcraceus* (Goosefoot) is also eaten. The root of the amaranth, *Pupalia* ? is prescribed for rheumatism and syphilis.

Amomum. The paste made from this plant is used to cure wounds. The rhizome of another variety of *Amomum* is used as a restorative, and sells for a high price.

Anchusa tinctoria (Borage wort). The root is used in small-pox.

Andrographis paniculata. A drug made from this plant is given to new-born infants.

Angelica. The root of the *Archangelica officinalis* is given as a tonic, as is also the root of tha "tuh-hua."

Aralia chinensis. A tincture made from this plant is prescribed for rheumatism and syphilis.

Artemisia Abrotanum (Southernwood). A decoction from this is given for colds. The *Artemisia Moxa* (Mug wort) is used as a counter irritant. The *Artemisia Dracanculus* (Wormwood) in skin diseases. And another *Artemisia* in puerperal fevers.

Arums, Aroids, or *Araceous* plants. The number of these in this district is considerable. I have identified the *Arisæma triphyllum*, used as an anæsthetic. The *Arisæma pentaphyllum*, given in apoplexy.

Atractylodes is used as a tonic; a lotion is also made from it for sore eyes.

Autumn Tree (*Catalpa Bungei*). Of the leaves of this tree a lotion is made for wounds.

Balsam (*Impatiens Balsamina*). The seeds are given to women in childbirth.

Bamboo. The flavourless bamboo. From the leaves of this bamboo an emollient decoction is made, which is prescribed for diseases of the head and chest.

Barberry (*Berberis* sp.). The root and bark are used as astringents.

Bead tree (*Melia Azedarach*). The fruit of this tree is used as a disinfectant and febrifuge.

Bell wort (*Platycodon grandifolium*) is used as a tonic. Out of the root an imitation ginseng is made.

Bignonia. The flowers are given in puerperal fever and certain female disorders.

Birth wort (*Heterotropa asaroides*). The root is used for rhematism.

Box tree (*Buxus semperrirens*). Of the wood combs are made, and of the leaves a cooling medicine.

Burr (*Xanthium strumarium*) is used as a tonic.

Camphor tree (*Laurus Camphora*) grows in Chang-yang and Kweichow. The wood forms a staple of native trade. A drug resembliug camphor is produced here.

Cassia (*Sophora japonica*) grows in Chang-lo. The buds are used for curing sores behind the ears, and a dye is made from the bark.

Caragana (?). The root is supposed to confer longevity.

Cart track (*Plantago major*). The seeds are used as a diuretic.

Castor-oil plant, The seeds are used for making castor-oil.

Centaury. Is used as a cooling medicine.

Cherry. The fruit of the wild cherry (*Cerasus*) and the cornelian cherry (*Cornus mascula*) is used as an astringent.

Chimonanthus fragrans. The leaves are used as a cooling medicine.

China root (*Smilax sinensis*). A decoction is made from the root.

China scullcap (*Scutellaria viscidula*) is used as a febrifuge.

Chrysanthemum. A lotion for the eyes is made of the flowers.

Cicuta (?) used as a stimulant.

Cinnamon is an article of local trade.

Convolvulus (*Convolvulus reptans* ?), sometimes called the China spinach. There is another edible convolvulus which I have not been able to class, a convolvulus out of the root of which an imitation ginseng is made, and two from which drugs are prepared.

Convallaria. Out of this a much-prized Chinese drug is prepared.

Clematis sp. Wood used as a laxative.

Colt's foot, prescribed for coughs.

Dandelion is used as a tonic.

Dogbane (*Apocynum juventas*). The root of this plant is supposed to confer long life and posterity.

Dolichos trilobus (?). This is a much valued plant here. The flower is eaten as a vegetable; the root is given in fevers, and from it a starch is made; the fibres are woven into cloth. It forms an important item in the domestic trade of the district.

Elecampane (*Inula sinensis*). Tonic and stomachic.

Fennel (*Fœniculum vulgare*) is given in dyspepsia.

Ferns. This district is very rich in ferns. Of the *Aspidium*, *Nephrodium*, and *Pteris*, called by the Chinese by the same name, the young fronds are used as food, and of the roots starch is made. A species of fern, probably the *Niphobolus Lingua* (classed by Chinese among sedges), grows in Changlo; it is used as an astringent, and is exported from here in native vessels.

Fumitory (*Fumaria officinalis* and *Fumaria racemosa*), given for jaunice. There is also a yellow variety resembling *Corydalis lutea.*

Fungus. The peasants in this district employ spare time in gathering various species of fungi, which are used as food and medicine, and form an important item of the domestic trade. The *Fuh-ling* or *Pachyma cocos* is used as a febrifuge and pepsic. Eighteen other fungi of this district are commodities of trade.

Gentian (*Erythræa*). The Chinese call this plant by the same name as the centaury, and employ it in the same manner.

Ginger.

Gingko yew (*Salisburia adiantifolia*). The fruit is used as a peptic.

Ginseng bitter (*Panax Schinseng*) root is used as a tonic.

Hedysarum (bird's-foot). Given for wounds and as an astringent.

Hermodactyl (*Uvularia grandiflora*) is used as a febrifuge, and to increase the milk of mothers nursing.

Hibiscus. There are five kinds; *Hibiscus esculentus*, *Hibiscus mutabilis*; two varieties of *Hibiscus syriacus*, white and red; *Hibiscus rosasinensis.* The first is used in skin diseases and to hasten parturition. The second and third for tumours and pulmonary diseases; and the fourth as a diuretic.

Honeysuckle (*Lonicera*). There are two varieties here, the tendrils of one being used to purify the blood.

Horse-tail (*Equisetum hyemale*?) Stems are powdered and used as an astringent. Another variety is given to purify the blood. *See* Marestail.

House leek (*Umbilicus malacophyllus*?) is used as a cooling medicine.

"Hsü tuan" (*Cirsium lanceolatum*) is prescribed as a tonic and for diarrhœa. "Hsiao-hsien" is taken internally as an anti-scorbutic, and the "ta-hsien" is made into poultices to apply to boils.

Iris is used in puerperal fevers. The rhizome of the *Pardanthus chinensis* is used for sore throat. Another variety grows wild all over the hills here.

Ipomœa (?). Identification doubtful.

Job's tears (*Coix Lachryma*). The seeds are given in lung diseases.

Juncus. The pith of this plant is used to absorb pus from sores.

Kwei hwa (*Olea fragrans*). Making scent bags of this flower is one of the minor industries of Chang-yang.

Libanotis. Prescribed for colds.

Lilium bulbiferum. The bulbs are eaten to purify the blood.

Lilium candidum is given as a tonic.

A much-prized Chinese tonic is prepared from the *Ancilema medicum.*

Levisticum. The root of this plant sliced and whole is largely exported as a medicine from Szechuan. It forms an important item in the Ichang Trade Returns.

Lophanthus. Two kinds are given as medicine to women.

Lysimachia. This is a plant belonging to the primula tribe. Identification doubtful. It is prescribed for skin diseases and for women in childbirth.

Madder (*Rubia cordifolia* and *Rubia*?), given for syphilis.

Magnolia. It is used as a stimulant. The bark of the *Magnolia hypoleuca* is used as a tonic.

Marygold (*Calendula*) is given as a diuretic. A lotion made from the flowers is used as an eye-wash.

Melanthium. "Pê-pu" is perhaps a species of Melanthium. A prized tonic is prepared from the *Melanthium cochinchinense* and other plants.

Melissa. Cultivated and wild, given as a stomachic.

Mint (*Mentha piperita*) is given as an anti spasmodic.

Mulberry (*Morus alba* and *nigra*). The liber of the mulberry root is prescribed for convulsions, The paper mulberry (*Broussonetia papyrifera*). Mulberry *Epiphyte.* The last is prescribed for women in child.

Mylitta lapidescens or *Luy-wan.* The tuber applied in itch.

Nettle (*Stachys*). The tubers are given for rheumatism.

Oats. I have seen a few oat fields on the hills. Oats here are used as medicine, and not for feeding cattle.

Oil tree (*Aleurites cordata* or *Elæococca Vernicia*).

Oil. Several kinds of oil are made in this district, such as oil from sesanum seeds, oil from tea and camellia seeds, oil from beans, oil from *Brassica sinensis* seed, oil from *Jatropha Curcas*, oil from fruit of tallow tree, oil from seeds of cotton plant, oil from *Aleurites cordata*, castor oil.

The immense amount of oil made in this district is locally consumed. Oil forms a large item in the food of the people. It is almost their only means of light at night. It is their only preservative of the wood of their nnumerable boats and of the frames of their houses. It is also necessary for waterproof clothing as a lubricant, etc., animal fats not being used for these purposes.

Oranges. Several varieties are grown here; they are the best oranges I have ever tasted. We have, among others, golden nutmeg orange (*Citrus japonica*), golden orange (another variety of the *Citrus japonica*), *Citrus Aurantium* (Tangier orange), *Citrus Margarita* (mandarin orange), *Citrus nobilis* (red orange), *Citrus Aurantium* (coolie orange), *Citrus Bigaradia* (thorny orange), *Citrus*? (another species of thorny orange), *Citrus fusca.* The cultivation of the orange is extending, and the export is increasing, as, as yet, they pass duty free, they do not appear in the Trade Returns. The dried oranges of the *Citrus fusca*, and the peel of the *Citrus nobilis*, are taxed on exportation and importation. They are used as tonics.

Orchids. There are several varieties in this district: *Dendrobium Ceraia*, used as a tonic. The stalks of various orchids are eaten as a vegetable. A pretty little orchid, somewhat like the bee orchid, grows wild on the hills here; it is not mentioned in the native Ichang gazetteer. It is called, locally, "pi-lan-wha." There are three kinds, red, yellow and white.

Pepper wort (*Zanthoxylum alatum*). The leaves are used as stimulants.

Phytolacca octandra. Used as an emetic.

Pœony. Pœonia Moutan, *Pœonia albiflora* used as an astringent, *Pœonia rubra* used as an alterative, *Pœony* bark is prescribed for female disorders.

Plumbago zeylanica. Used as a sudorific.

Polygonum Hydropiper. The juice is prescribed for itch.

Poppy. Much grown in this district. The cultivation is increasing. To still further encourage its growth, the *li-kin* (octroi) on the export of native opium has been recently reduced.

Pterocarpus flavus (?). The bark is used as a tonic. Identification doubtful.

Pucrasia thunbergiana. Root sedative.

Raspberry (*Rubus idœus*). Bark used as an astringent and ophthalmic.

Rhubarb.

Rouge plant. This is a species of *Carthamus* (?). From it is made the Chinese rouge, used as a cosmetic.

Safflower (*Carthamus tinctorius*) is exported from this district.

Sage (*Salvia plebeia*). Used medicinally as a restorative.

Sandal wood (*Santalum album*).

Shepherd's purse (*Capsella bursa pastoris*) is eaten as a vegetable here.

Siegesbeckia orientalis. Used as an emetic.

Silene saponaria. The seeds and shoots are made into medicine for wounds.

Soap tree (*Gleditschia sinensis*). From the seeds the Chinese make soap.

Spider wort (*Commelina medica*). Infusion of leaves is given as a sedative. The same as *Aneilema medicum* mentioned above.

Spindle tree (*Euonymus japonicus*) is used as a tonic.

Spurge (*Euphorbia*). Root is given in toothache.

Starch is made of the mealy taro, *Pachyrhizus trilobus* (syn. *Dolichos trilobus*, 3), *Pueraria thunbergiana*, *Aspidium root*, *Pteris*, *Nephrodium*, yam, potato, rice, wheat, etc.

Stonecrop is used as a vulnerary.

Tallow tree (*Excœcaria sebifera*). This is a most beautiful and useful tree. From the seeds Chinese extract vegetable tallow. In autumn the leaves are of a brilliant red, and as they are plentiful here they add greatly to the beauty of the scenery. They are hardy plants, and grow from seed. They might, I think, be acclimatized in Cornwall, Devonshire and South Wales.

Thalictrum, sp. Given in female disorders.

Trichosanthes. The powdered roots are given as a febrifuge.

Turnip. There is a medicine prepared here from turnip seeds.

Uncaria (?). A wine somewhat resembling tincture of catechu is made from this plant, and is prescribed for infantine maladies.

Valisneria is given by the Chinese the same name as Marestail.

Water-lily. Of the *Nelumbium speciosum*, there are two varieties used as food. Another species of water-lily (*Euryale ferox*) is used as a tonic and astringent.

Wax tree (*Ligustrum lucidum*) and *Ligustrum japonicum.* It is on these trees that the insect, belonging to the *Fulgoridæ* family of the *Homoptera*, which produces white wax, feeds.

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WÖHLER AND LIEBIG.

IN reading the memoirs which the friends of all more or less distinguished men who pass away now-a-days appear to consider a necessary part of their obsequies, it is not an uncommon experience to light upon letters which a reverential observance of the apophthegm "*De mortuis nil nisi bonum*" would have left unpublished. This is, perhaps, hardly the place to discuss the ethics of the question; but the doubt may be expressed whether even the plea of presenting a complete picture of a man is a sufficient justification for showing up his weaknesses, and, perhaps, meannesses, by means of letters that were never meant by the writer to meet the public eye. Certainly if there be an excuse for sacrificing the privacy of correspondence to the public curiosity it is when it may exercise a healthy influence upon public feeling, and fortunately such instances are continually occurring. One may be found in the *Journal of Science* for the present month. A series of letters and extracts from letters that passed between the two celebrated German chemists, WÖHLER and LIEBIG, during a friendship extending over nearly half a century, affords some pleasant glimpses at the relations that existed between these two great men.

The first letter is dated as far back as February, 1829, when WÖHLER was a professor at the School of Industry, Berlin, and LIEBIG was a professor at Giessen. The two men had seen one another for the first time a little while previously at the house of a common friend in Frankfort, where the mutual impression was so favourable that, although there had been more than one passage at arms between them, the short interview left a desire for closer friendship. A wish to this effect seems to have been expressed by WÖHLER, to which this letter is a warm response, LIEBIG affirming that he was fully convinced that the friendship would never be subject to an interruption by the skirmishes they had had or might have again. WÖHLER having complained of ill-health, LIEBIG attributed this to self-neglect, and told him that he would only learn to take care of himself when he had a family of his own, which he wished with all his heart might soon be the case. Later in the same year WÖHLER wrote again to LIEBIG suggesting that there must be a demon that took a certain pleasure in bringing them into collision by their work and making the public believe they were adversaries seeking for apples of discord. Declaring that the demon should not succeed, WÖHLER proposed that he and LIEBIG should undertake jointly some chemical work, leaving the choice of a theme to his friend. This proposal, in a letter dated four days later, LIEBIG "joyfully" accepted, and the result was their first joint memoir on the "Composition of Mellitic Acid." In 1830, BERZELIUS visited Germany, and WÖHLER was very desirous that whilst his old master was in Berlin LIEBIG might join the party, and wrote asking him that he would do so. Great as was the temptation, LIEBIG had to resist it, but was not ashamed to disclose the reason why. "A professor at Berlin can afford many things from which a professor of Giessen must desist." LIEBIG, however, met BERZELIUS subsequently at Hamburg, and he wrote to WÖHLER, "He has quite won my heart by his amiable and unpretending ways, and I perfectly understand your attachment to him." Shortly after this the letters took a still more familiar form, and WÖHLER having complained of the time taken up in the work of translating, LIEBIG wrote recommending him to give it up, and more vigorously than politely added, "To the deuce with your scribbling, and to the laboratory, where your place is, with yourself." To this WÖHLER replied manfully "that he had taken up the work "when he had more time to spare and a very small "income, and he felt bound in honour, and out of gra-"titude to BERZELIUS to finish it." About this time the curious growth of their friendship by correspondence, far outstripping their personal knowledge of one another, seems to have struck WÖHLER. "Was there ever anything more funny," he wrote, "than the "terms on which we stand? We are intimate friends; "we work together; we behave rudely or amiably as "the occasion offers, and yet neither has a very "clear idea what the other is like." But the time was soon to come when this anomaly was to be rectified, and the nature of the friendship tested. WÖHLER threw up his appointment in Berlin and accepted a similar one at Cassel, where he had barely settled when he lost by death his wife, to whom he had only been married two years. LIEBIG, who had on a previous occasion more than hinted to WÖHLER the preciousness of family ties, was able to sympathize with him in his bereavement, and did not rest until he had him under his own roof and working by his side in his laboratory at Giessen. It was under these conditions that their joint work on benzoic acid was done. After WÖHLER'S return home he wrote, "I have now returned to my dreary "solitude and do not know how to thank you suffi-"ciently for your love. I have been supremely "happy in working side by side with you, dear "friend." In 1836, WÖHLER was elected Professor of Chemistry in the University of Göttingen, and entered with renewed zeal into the investigations

which have indissolubly linked his name with that of LIEBIG in the annals of chemistry.

Twenty-one years had passed away before the date of the next letter we shall notice. Meanwhile LIEBIG had drifted away from WÖHLER in work and had taken up the application of chemistry to agriculture and physiology. These investigations, which were to bring him so much fame, appear to have yielded him but little satisfaction whilst engaged in them. Two letters that he had just received from WÖHLER, which he declared sounded in his ears "like a fairy tale," seem to have caused him unusual depression. "You have kept your mind unspotted," he wrote in reply; "you are able to "procure for yourself an enjoyment that is ever new, "while I feel as though I were a deserter, a renegade, "who has forsaken his religion." Nevertheless, he wrote in another letter, "I admire you and your splendid works." WÖHLER himself, like every honest worker, had a similar experience, when he became "very tired of chemistry" and "sick of the whole concern." But he recognized the disturbing cause and wrote to his friend, "It is high time for us to "take a good airing, to bathe ourselves in the pure "mountain air, and to keep away for some time from "everything like chemistry." Not less faithful and sound was the advice tendered by WÖHLER to LIEBIG in respect to disputes with his opponents. "What is the good of it?" he wrote on one occasion. "You will annoy MITSCHERLICH a little, amuse the public, embitter your life and ruin your health." And again, "To contend with MARCHAND, or with "somebody else, will do no good whatever, and be of "little use to science. It only makes you angry and "hurts your liver." But the years crept on, and both men in their letters began to show that they were not passing without leaving an impression. In October 1872, WÖHLER speaks of it as being a bore that in old age one is obliged to attach so much importance to the state of one's health. "Thirty or forty years ago nobody ever thought of asking the other whether he felt well." On the last day of the year LIEBIG wrote, "We shall not many times more be able to "wish each other a happy new year; but even when "we shall have died the ties which bind us will "unite us in the remembrance of men as an example "of two *savants* who struggled without envy in the "same sphere, ever united in the closest friend-"ship." The words of LIEBIG proved to be prophetic, for in the following April the news of LIEBIG'S death reached WÖHLER at Hanau.

We are informed that a mitigated penalty of £1 has been imposed within the last few days upon a chemist and druggist for a breach of the Patent Medicines Act in selling boxes of a proprietary corn plaster unstamped. The decision was based upon the ground that the description on the label as "——'s Corn Plasters" brought the article within the scope of the Act.

When referring by way of protest, last week, to some misleading remarks as to the purity of drugs inserted in the report of the Local Government Board, we illustrated the kind of mischief we thought might follow by quoting an extravagant misconstruction of them by a writer in the *Daily News*. We little expected, however, that in a few hours we should find the *Lancet*—which poses, at any rate, as an authority upon medical subjects—appropriating this absurd statement, and seriously declaring editorially that "from the returns of the public analysts it would appear that once in four times on an average a prescription made up at a chemist's shop is not compounded of pure drugs prepared in strict accordance with the directions of the British Pharmacopœia." We have no hesitation in saying that there is not the slightest foundation for such a statement in the report or the returns, which we strongly suspect were not even examined by our contemporary before writing the editorial article in which it occurs.

"Optics sharp it needs, I ween,
To see what is not to be seen."

* * *

We are able to announce that the General Pharmaceutical Association of Belgium and the Belgian Pharmaceutical Societies have decided to send out invitations for the meeting of the Sixth International Pharmaceutical Congress in Brussels, in accordance with the decision of the Congress held in London. It is proposed that the Congress shall take place towards the end of August or the beginning of September next, so that it will be coincident with the international exhibition to be held next year in Antwerp. For the purpose of carrying out the necessary preliminary arrangements a Provisional Committee has been appointed, of which M. D. A. Bartelaer is the President and M. E. Van de Vyvere is the Secretary. Among the subjects that will probably come under consideration are the report of the International Pharmacopœia Committee appointed in 1881, and pharmaceutical education. Other topics have also been mentioned which suggest the closer association of Continental pharmacists with the hygienic departments, such as the adulteration of food in its legislative and chemical aspects and the most trustworthy methods for determining the quality of water intended for drinking purposes.

* * *

It is announced that the Fifty-Third Annual Meeting of the British Medical Association will be held at Cardiff, on July 28th to 31st, 1885, under the presidency of William Thomas Edwards, M.D.

* * *

The *Lancet* reports a fatal case of poisoning at Banshee, Tipperary, through the administration of a liniment of ammonia and camphor by mistake. It appears that the medical practitioner gave verbal directions, but failed to place a label on the bottle. A coroner's jury returned a verdict of accidental death.

* * *

The *British Medical Journal* mentions that symptoms of morphia poisoning having been observed in several children at Chester, inquiry revealed the fact that some boys had stolen a 7lb. package of "cough lozenges" from a wholesale chemist and druggist in the city and distributed some among their companions.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

December, 1884.

10th.—Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Fletcher, Gale, Greenish, Linford, Plowman, Symons, Tanner, Taylor and Thresh.

MAJOR EXAMINATION.

Eight candidates were examined. *Five* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Banks, Alfred .....Stratford-on-Avon.
Blyton, Thomas Bage .....Manchester.
Clark, Thomas James .....London.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Twelve* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Baker, Sydney John .....Exeter.
Ballard, Walter .....Abingdon.
Barton, Thomas James .....Coventry.
Bennett, Frederick Birtwell ...Whitehaven.
Biggs, Frederick William .....Lichfield.
Bishop, William .....Bridgnorth.
Brigham, George .....Hull.
Brown, Frederick Edward .....Ipswich.
Camm, Alfred .....Kidderminster.
Collett, William James .....Nantwich.
Cornish, John Robert .....Wokingham.

11th.—Present—as on the 10th.

MINOR EXAMINATION.

Twenty-nine candidates were examined. *Twenty-one* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Clark, Owen Aly .....Bury St. Edmunds.
Courtis, Terrell.....London.
Dell, Frederick Barton .....Llanelly.
Everett, William .....Bedford.
Gooch, Stephen Leeds.....Reepham.
Gray, Philip .....Bristol.
Griffiths, John Egbert.....London.
Smith, Arthur William .....Redditch.

12th.—Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Corder, Ekin, Fletcher, Gale, Greenish, Linford, Plowman, Symons, Tanner, Taylor and Thresh.

MINOR EXAMINATION.

Twenty-nine candidates were examined. *Twenty-one* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brown, Robert Henry.....Wigton.
Howard, Wilkins Rigg .....Burnley.
Lowther, William .....Swansea.
Marshall, John.....Accrington.
Martin, John Bennet .....Falmouth.
Moore, Francis.....Mirfield.
Parker, William .....Wainfleet.
Parks, Henry .....Cobridge.

17th.—Present—as on the 12th.

MAJOR EXAMINATION.

Eight candidates were examined. *Five* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Cullinan, Edward .....London.
Saul, John Edward .....Rock Ferry.
Watts, George William .....Clapham.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Fifteen* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Moore, Joseph Edward .....Bristol.
Poole, Jeffrey .....Birmingham.
Rae, James .....Alderley Edge.
Rees, Charles Joseph .....Swansea.
Sage, Edward Thomas.....Atherstone.
Sanguinetti, Francis John .....Aylesbury.
Smee, Walter Wallis .....Axminster
Wilson, Albert.....Garstang.

18th.—Present—as on the 12th.

MINOR EXAMINATION.

Twenty-nine candidates were examined. *Eighteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Snoxell, Samuel .....Guildford.
Taylor, Francis William .....Newport Pagnell.
Temple, Charles Herbert .....Winchester.
Thatcher, Robert .....Mottram.
Thiele, Johann Fritz .....London.
Tibbits, John .....Lincoln.
Tregellas, Clifton Pare .....London.
Watson, William Malcolm.....Southport.
Wheldon, James Alfred .....Darlington.
Wilson, John .....Wolverhampton.
Wright, William Charles .....Stockport.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's examination:—

Certificates of the College of Preceptors.

Beer, William Robert.....Canterbury.
Coltman, William Thomas .....York.
Harrison, Edward Frank .....Holloway.
Jones, Edward .....Portmadoc.

Certificates of the Royal College of Surgeons of England.

Locke, William Drewry .....London.
Newton, Henry William.....Salisbury.
Thomas, Percy.....London.

Certificates of the University of Cambridge.

Bartley, William James .....Sidmouth.
Davies, John Tremere.....Bristol.
Shera, William Arthur .....Horncastle.

Certificate of the University of Oxford.

Parker, Christian.....Bath.

NORTH BRITISH BRANCH.

EVENING MEETING.

The first meeting of the thirty-first session was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, December 10, at half-past eight o'clock. Mr. John Nesbit, President of the Branch, presided.

The minutes of the last meeting of the previous session were read and confirmed.

The Chairman, in opening the proceedings, said that

he had considered it unnecessary to give a formal inaugural address on this occasion, but he felt that in the circumstances of their meeting for the first time in these new premises, he could not allow the opportunity to pass without expressing, on behalf of the Scottish adherents of the Society, the gratification which was felt from the acquirement of a permanent establishment in the metropolis of the North, and he was sure that he was expressing a unanimous opinion when he said that the pharmacists of Scotland, and more particularly those of Edinburgh, were deeply indebted to the Council of the Society and to those who had taken the leading steps in the movement for new premises. He scarcely required to say that the alterations on the house had been of a kind to render the premises suitable in every way for its requirements. As an examiner he could say that the technical examinations were now conducted with a comfort and facility which had not hitherto been experienced, and he believed that these conditions were in a great measure favourable to candidates. As a meeting place those present had that night an exceptional opportunity of knowing with what comfort they could assemble together even in the most inclement weather. They were aware that the primary object of the foundation of the North British Branch was the furtherance of pharmaceutical education, and the means by which, from the first, the leaders in Scotland had with the assistance of the leaders of the Society endeavoured to promulgate this object were the maintenance of the museum, for the furtherance of our knowledge of materia medica and allied subjects; the library, which had always been a useful one for reference and was every year growing more useful; and, lastly, for interchange of opinion on current pharmaceutical topics, and for the discussion of papers on pharmaceutical science generally, evening meetings had been held regularly in the winter months during the past thirty years. How well these objects had been carried out was sufficiently testified in their removal, but he might be allowed to say that the museum was of its kind second to none in Scotland, and there were indications of further development which were very gratifying. It had been often said that the Society could not be too well represented in Scotland, or in Edinburgh as the centre of medical and scientific education. It might be asked how this affected pharmacy, and he would only point out the position which pharmacy held in Scotland. He had had experience on both sides of the Tweed, and he could say that on the northern side only did pharmacists receive that support from the medical profession which they were entitled to. He spoke, of course, in a general sense, for it was quite in accordance with the order of things that there existed a class of pharmacists who would command the respect and confidence of all professions, wherever they happened to be located. It was well known that the Edinburgh School of Medicine was not a purely national institution, that was to say its students were not all Scotchmen, but young men came there from all parts of the globe. Consequently, he felt that it was a most important matter to place pharmacy prominently in the front amongst the educational institutions of the city. Medical students saw in Edinburgh what they probably could not see elsewhere, namely, pharmacy entirely in the hands of pharmacists, and he believed that from this they learnt a lesson, and that one of the principal reasons for this state of things was that they appreciated the fact that the education of pharmacists was carefully looked after by the Pharmaceutical Society. Hence the importance of having the North British Branch a prominent local institution; its primary results would no doubt be local, but he believed that it would ultimately benefit the whole pharmaceutical body. In beginning the thirty-first session of evening meetings he trusted that it would be as fruitful as previous sessions in the supply of interesting and practical papers. He believed that there were many who were able to contribute papers, who did not do so, because they felt that the subjects which they could discuss were too commonplace. This was a mistake. No matter how commonplace a subject might be, if new information could be given upon it, or if a member could show how a pharmaceutical operation could be facilitated or otherwise modified for good, his communication thereanent could not fail to be of interest at an evening meeting. He also trusted that the attendance would be kept up; there was nothing so discouraging as small audiences. He hoped that the discussions would be generally taken part in. Finally, the Chairman made an appeal for support to the Benevolent Fund, which he said was not the least important of the many objects of the Society, and was really the only charitable institution for the aid of pharmacists who had been unfortunate.

The following paper was then read by the author:—

The Estimation of Spirit of Nitrous Ether.

BY D. B DOTT, F.R.S.E.

Towards the end of last session I read a paper on spirit of nitrous ether, wherein I recommended the use of postassium iodide for the estimation of the nitrite. This suggestion has met with disapprobation and some misunderstanding, so that I have been led to make the following remarks supplementary to what was formerly said.

When the iodide is dissolved in water, the spirit of nitrous ether added, and then sulphuric acid, iodine is liberated as indicated in the equation—

$$2C_2H_5NO_2 + 2KI + H_2SO_4 = 2C_2H_6O + 2NO + I_2 + K_2SO_4,$$

the iodine being estimated by standard solution of sodium thiosulphate—

$$2Na_2S_2O_3 + I_2 = Na_2S_4O_6 + 2NaI,$$

and so by a simple calculation the percentage of ethyl nitrite is found. This would be a very convenient and accurate process if the reaction given represented all that takes place. Unfortunately, however, this is not so, and by the secondary action which ensues, the value of the method is to a greater or less extent vitiated. This result is caused chiefly by the oxidation of the nitric oxide to tetroxide, which, either directly or by reforming nitrite, liberates a further quantity of iodine. The error so produced is very great when the nitric oxide is liberated in a confined space, such as a flask, and is reduced to a minimum when the gas escapes freely and is rapidly carried off. Obviously, however, a certain degree of inaccuracy must arise from this source, especially considering the comparatively high temperature at which nitrogen peroxide liquefies. Possibly by passing oxygen-free carbonic anhydride through the liquid during the whole course of the operation, the oxidation of the dioxide might be prevented, but that method is troublesome, and, moreover, would probably introduce a new kind of error by removing a portion of the ethyl nitrite. Besides, as what we desire is a simple and easily applied method of estimating the nitrite, all elaborate arrangements are excluded. In my former paper I recommended the use of a certain proportion of spirit along with the potassium iodide solution, in order to avoid loss of ether, but I have since found that an excess of alcohol does more harm than good. I cannot say precisely how this occurs, but very likely it arises from the more ready formation in spirit that in water, of nitrous acid, from the decomposition of the tetroxide. Yet it is better to employ a little alcohol, as, if the spirits of nitre be strong, there is sure to be some loss from a purely aqueous solution. I have obtained fairly concordant results, proceeding as follows:—Dissolve (in a small, flat basin) 1 gram of potassic iodide in 20 c.c. water, add 10 c.c. alcohol, and then 5 c.c. of the sample to be tested. Mix by stirring. Now add 5 c.c. dilute sulphuric acid, leave for an hour, then titrate the iodine with decinormal thiosulphate. The number of c.c. multiplied by 0·1666 gives the percentage by volume of ethyl nitrite equivalent to the iodine liberated, assuming

that the specific gravity of that ether is ·900. Here are some of the results :—

A. (1.) 19·0 c.c. = 3·16 vol. per cent. $EtNO_2$.
(2.) 19·0 c.c. = 3·16 vol. per cent. $EtNO_2$.
B. (1.) 16·7 c.c. = 2·78 „ „ „
(2.) 16·8 c.c. = 2·80 „ „ „

But does the iodine liberated really approximately represent the proportion of nitrous acid? If not, the results are merely empirical and comparative. If we had been in possession of some pure ethylic nitrite, a very ready and conclusive means of settling the question would have been at my disposal, but I must confess that I have not succeeded (in the time allotted to this work) in preparing nitrous ether of constant boiling point or of undoubted purity. However, it is of interest to note the experiments performed with a 5 per cent. (by vol.) solution of the purified ether.

(1.) 5 c.c. added to solution of iodide of potassium, etc., as above described, required 24·0 c.c. = 4·00 vol. per cent. $EtNO_2$.

(2.) 10 c.c. mixed with 10 c.c. solution of potash (1 : 3) in a phial, which was then securely corked, tied over, and placed in water-bath for five hours. Solution was then evaporated to small bulk, diluted with water to 4 litres, acidified with sulphuric acid, and titrated with a 10 per cent. solution of potassium permanganate. Required 32·4 c.c. = 0·384 gram $EtNO_2$, equivalent to 4·26 vol. per cent. This calculation is based on the equation

$$10KNO_2 + 4KMnO_4 + 11H_2SO_4 = 7K_2SO_4 + 4MnSO_4 + 10HNO_3 + 6H_2O,$$

the 10 molecules of potassium nitrite being of course equivalent to 10 molecules of ethyl nitrite.

(3.) 5 c.c. assayed by Eykman's process,* gave :—*a.* 30·4 c.c. and *b.* 30·4 c.c. NO, at 16° C., Bar. 30·3 inches. 30·4 c.c. corrected for *P* and *t* = 28·56 c.c. = 0·03828 gram NO = 0·0957 $EtNO_2$ = 2·126 vol. per cent.

The same experiments were repeated with a sample ordinary spirit of nitrous ether.

(1.) With iodide method = 3·166 vol. per cent. $EtNO_2$.

(2.) Two portions of 10 c.c., each saponified in phials as formerly described, 10 c.c. rectified spirit similarly treated. Required of permanganate solution :—

a. 23·6 c.c. *b.* 24·2 c.c. alc. 0·3 c.c.

mean of *a.* and *b.* − 0·3 = 23·6 c.c. = 0·28 gram $EtNO_2$ = 3·111 vol. per cent.

(3.) 5 c.c. assayed by Eykman's process yielded :—*a.* 25·3 c.c., and *b.* 25·3 c c. NO, at 19° C., and 30·4 inches Bar. 25·3 corrected = 23·42 c.c. 0·03147 gram NO = 0·07867 $EtNO_2$ = 1·573 in 100 vols., *i.e.*, 1·74 per cent. by vol.

These results are sufficiently surprising. It might be urged, in the case of the spirits of nitre that the aldehyd resin and other compounds would account for the high numbers obtained with permanganate; but this plea could scarcely hold good with the solution of ethyl nitrite, which was certainly free from aldehyd, and we see that the rectified spirit is only a trifling source of error. At the same time it is difficult to believe that the purified ether contained only about half its volume of real nitrous ether. In considering the matter it occurred to me that some light might be thrown on the subject by assaying in the same way a solution of sodium nitrite. 2 grams of the commercial salt were therefore dissolved in water, and the solution diluted to 100 c.c.

(1.) 5 c.c. tested by iodide method, took 16 c.c. thiosulphate solution = 2·20 grams $NaNO_2$. The same test applied, but solution of $KHCO_3$ used instead of water, required—

14·1 c.c. = 1·94 gram in the 100 c.c.
13·8 c.c. = 1·90 „ „ „
14·2 c.c. = 1·95 „ „ „

[It is possible that the introduction of $KHCO_3$ may be of value in the assay of spirits of nitre by this method.]

(2.) 15 c.c. largely diluted, acidified, and standard permanganate added, until it ceased to be decolorized. Required 26·5 c.c. = 0·289 gram $NaNO_2$ = 1·92 gram in the 100 c.c. (making the salt = 96 per cent. real nitrite of soda). The experiment was repeated, using smaller and larger quantities of the solution, but the results did not vary considerably.

(3.) 5 c.c. by Eykman's process gave *a.* 18·7 and *b.* 18·7 c.c. NO, at 21° C. and 30·3 inches Bar. 18·7 corrected = 17·0 c.c. = 0·02284 gram NO = 0·05255 $NaNO_2$ = 1·05 gram in the 100 c.c.

[The experiment was repeated in several different ways, varying the proportions of acid, ferrous solution, and time; but with no material variation in the result.]

Assuming that the equations given before truly represent the respective reactions, the results obtained by the saponification method and by Eykman's process are not easily reconciled, though they may be susceptible of some explanation which has not occurred to me. If Eykman's method is sound as regards nitrite of sodium, then a method which has the authority of Fresenius is fallacious; while if unsound as regards the sodium salt, how do we know it to give trustworthy results with ethyl nitrite? Moreover, if Eykman's process holds good with nitrite of soda, all assays of spirits of nitre, based on saponification with potash and titration with permanganate must be quite wrong. On the other hand, it is not easy to understand why the reaction with ferrous sulphate solution should proceed differently in the one case from what it does in the other, and even if there is this difference, we have still to explain the striking discrepancies in the results obtained by the two methods in the assay of solution of ethyl nitrite. I have found that nitrate of potassium, by Eykman's process, yields no nitric oxide. If the nitrite decomposes as follows :—

$$3NaNO_2 + H_2SO_4 = NaNO_3 + 2NO + Na_2SO_2 + H_2O,$$

we have a possible explanation of the difficulty. Evidently this "interminable subject" has not yet been exhausted.

* *Pharm. Journ.*, [3], xiii., 65.

The Chairman, in moving a vote of thanks to Mr. Dott, said that the meeting was very much indebted to him for this communication. The results which he had now arrived at were, he thought, of such a nature as to further convince them that sweet spirit of nitre was a most difficult subject to handle. The method which Mr. Dott had proposed for the estimation of the spirit was, in his opinion, one well adapted for everyday use, and that such a method was required was patent to anyone who had observed the variability of the spirit. He was afraid that little could be said about the paper that night, because it was one which required some consideration before opinion was expressed upon it, but he hoped that those who had experience in the subject would be able to throw some light on the difficult problems which were involved in the communication.

Mr. Stephenson having seconded the vote of thanks, which was carried with acclamation,

Mr. MacEwan said that he agreed with the Chairman in his remark that the paper just read was one which required some consideration before much could be said about it. The very fact that it was the result of some hundreds of experiments gave it a value which precluded any hasty comment or criticism. Although he was prepared to hear that Eykman's method gave somewhat low results, because it was not possible to drive off all the nitric oxide by heat and because there was a slight loss by exposure, yet the result of Mr. Dott's work tended to show that there was something radically wrong about the process. How this could be was very difficult to perceive, for the process was an exceedingly correct one in theory, and, provided sufficient ferrous sulphate and sulphuric acid were used, he had believed that the results were satisfactory. It was most important to use iron and acid solutions of sufficient strength; thus, for a 3 per cent. spirit of nitre 10 c.c. of ferrous solution and 5 c c. of acid solution, each 1 in 5, were just enough for 5 c.c. of the spirit. He did not think it possible to use too much ferrous solution; he had always used a large

excess, because some preliminary experiments which he had made tended to show that an excess helped to retard oxidation in the measuring vessel, so that it could be completed in the assay flask. He had a strong prejudice in favour of Eykman's method for the purposes of research; on the other hand, he had never been able to get constant results by the saponification method, using that proposed by Dupré. These methods were not suitable for general use, so that it was a satisfaction to turn to another method, that proposed by Mr. Dott, and to learn that it was one which was very well adapted for the use of pharmacists. In performing this test it was most important to follow closely the directions given by Mr. Dott as to the use of a flat dish, which allowed the nitric oxide to escape and thus avoided secondary reactions. He had used the method with most satisfactory results, and he knew others who now used it as occasion required, and who spoke highly of it. In view of Mr. Dott's statements regarding these three methods, there remained considerable work yet to do by those who had practically interested themselves in the subject, even although it should only be to satisfy themselves of the correctness of Mr. Dott's conclusions. He cordially supported the vote of thanks, which was well deserved.

Mr. Boa said that he agreed with the previous speakers regarding the technical difficulties of the subject; indeed he rather felt that the subject was a chemical specialty, to be handled by specialists. But no doubt the meeting generally admired the interesting manner in which Mr. Dott had given his results, and it would be noticed that these results nearly controverted what had previously been done by Mr. Dott and other investigators. Now he was tempted to ask what he felt to be a serious question. A great deal of time and labour had been spent on the subject, and numerous papers upon it had been read, and yet we did not seem to be nearer a solution of the difficulty, we did not seem to be nearer a preparation of definite composition. Therefore he was tempted to ask, What is the good of all this? Spirit of nitre continued to be swallowed and continued to do good, and perhaps some would venture to think that that was all that was required. He did not mean to underrate the work which was being done; it was knowledge gained and added, which could only be fully appreciated when completed.

Mr. Hill believed that the paper was a valuable contribution to the subject. Spirit of nitre he held to be a most unscientific compound, because it was one which changed rapidly, so that when a few weeks old it was quite different from what it was when prepared. He did not think that the active principle was really known. If nitrite of ethyl, how did it happen that old samples produced very marked diuretic effects? As to the estimation of the spirit, the paper which had been read seemed to bring the subject no further forward, for the reasons which had already been stated. He would like to remark regarding an objection which had been made to Mr. Dott's iodine process, that that objection seemed to be based on an assumption that the process had been put forward as a very accurate one. That was quite a mistake. The method was rather like that of Pelouze for the estimation of nitric acid; its accuracy depended very much upon the care and rapidity of manipulation. Mr. Dott's process gave satisfactory if not very fine results, and what was wanted was just such a process as this, namely, one that could be generally used and which gave a good approximation to the actual strength.

Mr. Dott, in reply, said no one could be more conscious than he was of the unsatisfactory nature of his subject. There remained difficulties yet to be solved, although he did not think that the active principle was one of the difficulties. It had been very clearly proved that nitrite of ethyl was a powerful diuretic, and he had not found preparations weak in this constituent to be powerful diuretics. He was glad to know that the iodine method had been found useful in other hands, as it had been his intention to make it one which could be generally used.

The next paper read was on—

The Estimation of the Oxides of Mercury.

BY M. DECHAN AND T. MABEN.

The estimation of the oxides of mercury where these are associated with minutely divided metallic mercury is admittedly a somewhat critical proceeding. When we commenced, some nine months ago, the work for the paper which was subsequently read before the Pharmaceutical Conference we made a series of experiments with various processes. These experiments were in the first instance, qualitative, and those processes only which were likely to give reliable results were experimented with quantitatively. The method ultimately adopted, which consisted in treating with acetic acid the substance supposed to contain oxides, had given us the best results, though we by no means claim for it absolute accuracy. In the estimation of such substances as the oxides of mercury, the conditions of which are very liable to become changed in the course of manipulation, there are many sources from which error may arise, and he would be a bold chemist who would maintain that any particular process was perfect. Among the methods tried and set aside as untrustworthy was that which consisted in treating the preparation in which oxides are supposed to be present, with dilute hydrochloric acid and hydrocyanic acid. We found that the first part of the process, viz., the estimation of mercuric oxide by means of hydrochloric acid gave too high results, consequently we went no farther, deeming it unnecessary to make any experiments with hydrocyanic acid. This process having lately been contrasted by Mr. Senier with the acetic acid process, very much to the apparent discredit of the latter, we have thought it our duty to repeat our experiments and this note gives our results.

Before going further we desire to apologize to Mr. Senier for having unintentionally overlooked his former paper on blue pill. Through some oversight or carelessness, we had failed to notice the reference to that paper in the Journal index, and were consequently ignorant of his researches on the subject till after our paper had been read at the Conference. At the same time, the process employed by him did not, as he will now perceive, escape our attention.

The Estimation of the Oxides of Mercury by means of Acetic Acid.—The description of this process has so recently appeared in full that it is unnecesary to repeat it here. Our former experiments were made with inorganic mixtures containing oxides and it is therefore possible that less satisfactory results would have been obtained had we employed organic mixtures. This occurred to us at the time, but we were of opinion that so long as the acid was in excess, there was little danger of error, because even if the mercurous or mercuric acetates were reduced "to oxide" as has been suggested by Mr. Senier, the acid was certain to redissolve it, so that whatever "reduction" there might be, there could certainly be no precipitation of undissolved oxide. Unless some chemical were present that would reduce the oxides to the metallic condition, there would be no fear of too low results being obtained, and this cannot occur in the case of blue pill. The only objection on *à priori* grounds to the process is that a portion of the mercurous acetate might be converted by continued boiling into mercuric acetate, but this is the utmost that could be expected to occur.

Of the two oxides, the mercurous is the more difficult of estimation, owing to the comparative insolubility of its acetate in cold water, which renders it *absolutely essential that the solution be filtered hot.* In repeating our experiments on blue pill containing known quantities of oxide, the mercurous oxide was therefore employed, in order that the results, and also the comparison with Mr. Senier's results, might be as fair as possible.

A weighed quantity of freshly prepared blue pill, to which 5 per cent. of mercurous oxide had been added, was examined by the acetic acid process, the boiling being continued for not more than five minutes, and as the result we obtained mercurous chloride equal to 4·5 per cent. of oxide. There were distinct traces of mercuric acetate in the filtrate, but the percentage was not estimated. A variation of this experiment was then tried. We mixed 0·03 grams of mercurous acetate with blue pill mass and treated the mixture in the same way as before, adding excess of acetic acid. The quantity of mercurous chloride found by us, viz., 0·025 grams, corresponds very nearly with the theoretical yield, which will be found on calculating from the formula $Hg_2(C_2H_3O_2)_2$ to be 0·027.

In both these estimations the results were too low, the cause of this being, in our opinion, the conversion of a small proportion of the mercurous acetate into mercuric, but as we were quite satisfied that they were such as to give confidence in the method, we did not pursue the investigation further.

We cannot understand why Mr. Senier got results so very different from ours; probably he had not used the acid sufficiently in excess, or had filtered the solution in the cold. Either hypothesis would sufficiently account for his low results, but if neither were applicable, then he may by unnecessarily prolonging boiling have converted most of the mercurous acetate to the mercuric condition.

We have again examined the four year old pill mass, which was returned in our Conference report as containing no oxides, taking every precaution against possible error, and we find in it traces of both oxides, but these are so infinitesimal that no one would attempt to weigh them. This mass is moderately dry, and if, in that condition, it is so slightly oxidized we may safely assume that the other masses, many of which were extremely moist, will be even less likely to contain oxide. We are quite aware of the fact that finely divided mercury is always liable, even under the most favourable condition, to contain traces of oxides, but the proportions in which these occur in the samples referred to are such that the therapeutic action of the pills can in no wise be affected, and consequently the latter may be said to be practically "free from oxide."

The Estimation of Mercuric Oxide by means of dilute Hydrochloric Acid.—As already indicated we made several test experiments with this process, with the result that we rejected it as untrustworthy. The process consists in digesting the blue pill mass with dilute hydrochloric acid, and after filtration estimating the proportion of mercury in the filtrate.

It is not stated whether the digestion is carried on in the cold, or at a higher temperature. If the latter, the results would, if mercurous oxide were present in the substance under examination, be vitiated because, according to Fresenius,* "highly dilute hydrochloric acid dissolves subchloride of mercury slowly at a higher temperature, and upon ebullition with access of air, the whole of the subchloride is gradually dissolved" with formation of mercuric chloride.

The chief source of error exists, however, not in the mercurous oxide so much as in the action of the hydrochloric acid on the metallic mercury itself. Dilute hydrochloric acid dissolves metallic mercury when that is in the minutely divided condition in which it exists in blue pill or grey powder, freely on being heated, and quite appreciably in the cold. To prove this, we took a quantity of grey powder, dissolved and decanted off the carbonate, carefully washing the residue with warm water. The residue was then boiled in strong hydrochloric acid and again washed. To prove the absence of oxides it was now boiled in acetic acid, and this on being decanted was found to contain no trace of mercury. The metallic mercury was now digested for five minutes in cold dilute hydrochloric acid, of the usual laboratory strength, with the result that the clear liquid on decantation gave with sulphuretted hydrogen perceptible traces of mercuric chloride. A weighed quantity was treated in this manner, and on digesting for about twenty minutes in warm dilute hydrochloric acid, mercuric sulphide representing 0·23 per cent. of supposed oxide was obtained, and on further digesting the residue for two hours in cold dilute acid, 0·1 per cent. of supposed oxide was separated. These facts are in our opinion sufficient to indicate that this process is untrustworthy, in so far as the estimation of mercuric oxide in the presence of metallic mercury is concerned.

The Estimation of Mercurous Oxide by means of Hydrocyanic Acid.—For the reasons already stated, we made no experiments with hydrocyanic acid. We have no doubt that the process may give fairly accurate results, but, at the same time, the reactions involved are in our opinion too hypothetical, and have not been sufficiently proved to form the basis of an analytical method. So far as we are aware, mercurous cyanide has never yet been isolated. It is a most unstable compound, and if formed is more or less rapidly decomposed into mercuric cyanide and metallic mercury. It is quite possible it may be formed—we can find no evidence to the contrary—and if so, the question is, how soon, and under what conditions is it decomposed? Certain elements of doubt, therefore, enter into this method, so much so, as in our opinion to vitiate the results.

While this note is not intended as an *ἀπολογία* in reply to the critics of our Conference report, it may not be out of place if we refer to a few points in Mr. Senier's paper and the discussion that followed the reading of it.

Mr. Senier thinks that mercury is more liable to become oxidized in blue pill than in grey powder. That is not our opinion. Mr. Senier's main argument against the acetic acid process tells with equal force, as Professor Redwood pointed out, against his own theory. It is difficult to conceive of oxidization being more rapid in the case of the pill provided it is kept in a moderately moist condition, It is singular that the only really dry and powdery mass of those we examined gave appreciable proportions of oxide. It is probable that this may account to a certain extent for the differences between Mr. Senier's results and ours. Certain masses are more hygroscopic than others, and the conditions in which they are stored will also affect them as to dryness and moisture. If Mr. Senier's masses are dry and powdery we would certainly expect them to contain oxides, but we should not examine them with hydrochloric and hydrocyanic acids.

Mr. Umney says we took too much for granted in assuming that certain pill masses were prepared with confection of hips, because of the absence of the colour reaction, and suggests that traces of iron might have, by the formation of tannate of iron, obscured the pink colour. As to this, we prepared a sample from hip confection; and though we relied principally on the colour we also judged to a certain extent by comparison. Of four out of the five samples we are in no doubt whatever; the fifth might possibly have been made with confection of roses, but even that was not "faintly black," the colour was not deeper than a muddy brown. Mr. Umney suggests that iron might have been added to see whether tannin was or was not present; if the former the pill is assumed, we suppose, to have been made with confection of roses. This seems to us, in Mr. Umney's own words, rather like "jumping to a conclusion." The suggestion is evidently made under the idea that confection of hips contains no tannin, but this is an entire misconception, as any hip confection that we have tested contained abundant evidence of tannin. Mr. Umney's test, in so far as it seeks to differentiate between rose and hip confection, is, therefore, of no service whatever, and many of those pharmacists who have calmed their consciences by acting on the friendly suggestion may probably find that they are leaning on a broken reed.

* 'Quant. Analysis,' Ed. 7, vol. i., p. 144.

Lastly, we were taken to task by a number of speakers on account of our strictures regarding the state of pharmaceutical morality as evidenced by the "strength and condition" of some of the samples we examined. It is doubtless sometimes unpleasant to hear the truth told—as it is also to tell it—more especially if the telling of it is accompanied with some plain-spoken criticism, because then it cannot be so conveniently ignored. It was natural that we should, after having stated the facts, have made the inevitable comment regarding them, and consequently we do not admit having exceeded our duty; but as this is entirely a matter of opinion, it would obviously be useless for us to attempt any justification.

The paper was read by Mr. MacEwan, who explained that it was the intention of the authors to have the paper read at the last evening meeting in Bloomsbury Square, but it was too late. He hoped, however, that it lost none of its importance by being read at the Branch, as he was sure that those present would fully appreciate the value of the communication.

Mr. Hill said that the paper was a controversial one, and he had no desire to enter into the controversy, therefore in any remarks which he had to make he did not wish it to be supposed that he entered into the warfare. He was quite sure that Messrs. Dechan and Maben were able to hold their own. It had struck him as a curious fact that in the preface to their paper contributed to the Conference, the authors had remarked that they would not have taken up the subject had it not been in the Blue List, because the subject had apparently been threshed out, though the fact was that the paper had given rise to more discussion than any other one read at Hastings. This led him to remark that old-fashioned remedies gave a large field for research, because the most of our knowledge was the result of the labours of old authorities who, though strictly conscientious and painstaking in their work, did not have the most refined methods or best opportunities in their researches. For these reasons would it not be right that young investigators should turn their attention to work of corroboration or refutation? In reference to the paper under discussion he might refer to the authors' statement that they did not think that they were called upon to withdraw any of their previous statements. There was one which he felt required some modification, namely, that in which they stated that in certain blue-pill masses they found absolutely no trace of oxides. Now if ordinary metallic mercury were shaken up with distilled water it would be found that a muddiness was imparted to the water, and on testing with ordinary reagents it would be found that mercury was present in the water. From this he inferred that mercury as we found it was always contaminated with oxide, consequently grey powder and blue pill *must* contain appreciable traces of oxide from the first. To what extent mercury in the free state became oxidized was a matter which seemed worthy of investigation. He could quite confirm the statement that hydrochloric acid acts upon pure mercury. He had digested mercury (free from oxide) with hydrochloric acid, a little stronger that B.P. dilute, and in cold and boiling conditions, and in each state got abundant evidence of the solubility of the mercury. Using strong acetic acid he found that even on heating the acid had no action upon well washed mercury. He would therefore prefer Messrs. Maben and Dechan's method to that proposed by Mr. Senier. He would like to say a word regarding the medicinal properties of these preparations, particularly grey powder. It was accepted as correct that their activity is due to contained oxides; believing this to be so, it was most anomalous that a step should not be taken to remedy the dangerous proceeding of prescribing an article which varied in potency according to the conditions of manufacture and in proportion to age. Grey powder could not be made twice alike, no matter how careful the manipulator might be. For these reasons he was strongly of opinion that a standard preparation, perhaps a mixture of mercurous and mercuric oxides, preferably the more stable mercuric oxide, diluted with sugar of milk for example, should be introduced and put on trial. It was apparent to those who had experience with grey powder that a change was desirable, and no opportunity was better than the present for effecting a change for the better.

Mr. Dott said that he could not go into the pure pharmacy of the subject, but he thought it was an instance of how the chemistry of a metal becomes complicated by the presence of organic compounds. That mercury is attacked by hydrochloric acid would not be proved by the latter giving a black precipitate with sulphuretted hydrogen as such precipitate or coloration might be due to another metal. It was surprising that mercury was more liable to oxidation in the dry state than in a moist condition. It was generally believed that the moist condition was the more favourable for oxidation.

Mr. Hill now remarked that he had not relied solely upon the sulphuretted hydrogen test, but had boiled the solutions with bright copper, upon which in the case of the hydrochloric acid solution only was mercury deposited. He considered this to be conclusive evidence.

After some further remarks, the thanks of the meeting were accorded to the authors of the paper.

The Secretary in Scotland then drew attention to the donations to the Library and Museum, which were placed upon the table. These comprised the following:—

To the Library—

Proceedings American Pharmaceutical Association, 1883. From the COMMITTEE OF PUBLICATION.

Annual Report of the Alumni Association of Philadelphia, 1883–84. From the ASSOCIATION.

Report of the Board of Regents, Smithsonian Institution, 1882. From the INSTITUTION.

The Flora of South Australia, 3 parts, From Mr. THOMAS MABEN.

Register of the Pharmaceutical Society of Victoria, 1884. From the REGISTRAR.

To the Museum:—

Specimens of Cinchona succirubra (stem, flowers, fruit and seed); C. Calisaya (stem, flowers and fruit); C. officinalis (stem, flowers, fruit and seed); C. robusta (seed); Cardamom seeds, Coffee beans, Castor oil seed, and other specimens, altogether eighteen in number, and representative of Ceylon products. From Mr. WILLIAM YOUNG, Glasgow.

Salicylic Acid (dialysed), Bromide of Sodium and a fine crystal of Iceland Spar. From Mr. ALEX. KINNINMONT.

Specimen of biennial Henbane Leaves. From Mr. WILLIAM GILMOUR.

Specimens of Oil of Ergot, Bromide of Sodium and Persian Opium in sticks. From Messrs. T and H. SMITH and Co.

Specimens of Waldwolle (two qualities). From Mr. THOMAS GREENISH.

Specimen of Rio Ipecacuanha. From Messrs. WRIGHT, LAYMAN and UMNEY.

Specimens of Borneo Camphor (four qualities), Borneol, and five specimens of Gambier. (Portions of the Jahore collection of the Forestry Exhibition). From Professor ARCHER.

Specimens of Alizarine (artificial), Aniline, Anthracene, Naphthaline and Nitrobenzol. From Mr. J. R. HILL.

The donations also included—

Three coloured photographs of annual and biennial Henbane plants. From Mr. WILLIAM GILMOUR.

A series of twelve photographs of the Society's House, 17, Bloomsbury Square. From Mr. MICHAEL CARTEIGHE.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The second monthly meeting of the above Association was held at the Church Institute, on Wednesday, December 3. Mr. James Abbott, Vice-President, in the chair.

The Honorary Secretary having drawn attention to the recent donations to the museum and library, the Chairman called upon Mr. W. Elborne to read a paper—

Remarks on Chinese Rhubarb.

BY WILLIAM ELBORNE,

Assistant Lecturer on Materia Medica, Owens College.

In a paper read before the British Pharmaceutical Conference at Hastings (*Pharm. Journ.*, Aug. 16 1884), I drew attention to the two varieties of English rhubarb grown in this country, their cultivation, collection and chemical composition, together with the following physical characters whereby the two drugs might be distinguished from one another.

Both varieties of *R. officinale* (*i.e.*, both the "cultivated" and "highly cultivated') occur in flat concavo-convex pieces, weighing from 3 to 4 ounces each. The outer convex surface displays a number of deep, longitudinal furrows, the effect of drying, and is traversed throughout with a longitudinal ramification of conspicuous veins, producing altogether a different appearance to the fine *net-veined* markings displayed by some samples of the present commercial East Indian rhubarb. In the centre of the concave surface of each piece a small hole has been drilled half-way through for the purpose of ascertaining the soundness of the pieces internally, and in this feature it corresponds with the now extinct Russian rhubarb. The pieces show the same stellate markings as the East Indian, especially on the inner surface, much more in some than in others. While the "ordinary" and "highly cultivated" bear a great resemblance to each other externally, the fracture of the former shows a more compact structure, and the internal veins a deeper colour; the odour is stronger and the colour of the powdered root is much darker coloured than the highly cultivated. Neither varieties present the red appearance displayed by the fracture of *R. rhaponticum* or the imported drug, nor do they yield the same bright yellow powder of the latter. They are distinctly gritty when chewed. On fracture the comparatively black colour of the veins imbedded in a whitish parenchymatous tissue readily distinguishes the cultivated varieties of *R. officinale* from *R. rhaponticum*.

A few months ago, having occasion to purchase some recently imported East Indian rhubarb, I was struck by the exact resemblance it bore to the English grown *R. officinale*; the only noticeable difference being its relatively heavier weight. Although already satisfied as to its being of Asiatic origin, I submitted a portion to Mr. Rufus Usher, of Bodicote, asking whether he recognized it as his produce or not, and received the following in reply:—

"Bodicote, *November* 4, 1884.

"Dear Mr. Elborne,—The best reply I can give you as to the sample of rhubarb is, after giving it my best attention, somewhat problematical. That the specimen is the true officinale there can be no possible doubt, and its appearance, as compared with my own production, varies but very slightly. The shaping appears very much like mine, and the method of trimming has a similar indication; it does also appear a little heavier than mine and the odour richer, which might arise from its connection in a box with East Indian.

"Although appearances favour a strong resemblance to mine, there are indications that do not quite agree with my own production, and taking one thing with another, I rather think with you that it is not mine.

"Yours faithfully,

"Rufus Usher."

The true source of Chinese, Canton or East Indian rhubarb has long been a moot point, and reputed to be either *R. officinale* or *R. palmatum*, var. *tanguticum*, or both species, and as well known the imported *drug* possesses great differences as regards both quality and physical appearance. Having carefully examined numerous samples I find that they may be readily separated into two groups according to the nature of their exterior grain or venation, and the colour of the fracture as follows:—

I. East Indian rhubarb possessing the characteristic white lattice-worked venation with a red grained fracture.

II. East Indian rhubarb possessing a longitudinal ramification of white veins with a black grained fracture.

The following statement concerning East Indian rhubarb, reprinted from the "Drug Market" column of the current number of the *British and Colonial Druggist*, tends also to support my views:—

"Rhubarb has been freely offered, and in excess of the demand. At auction only a small part sold at steady rates for Shensi, but without demand for Canton and high dried. Shensi, small size, pinky fracture, round, 3*s.*; ditto, roughish flat, 2*s.* 1*d.* to 2*s.* 6*d.*; medium to bold, round, fair pinky, with one-third dark and poorly trimmed, 2*s.* 6*d.* Canton, well trimmed but grey fracture, round, medium bold, 1*s.* 8*d.*; high dried, bold medium, flat, pale coat, and good fracture, held for 1*s.* 6*d.*; small medium ditto, held for 1*s.* 4*d.*; medium, round, rough coat but fair fracture, but suitable for grinding, was sold at 8½*d.*"

The inference to be drawn from the above is consequently—

1. That Chinese rhubarb consists of two varieties, possessing different physical appearances.

2. That the black-veined variety described in paragraph II. is yielded by *R. officinale*.

3. That the red-veined variety described in paragraph I. is yielded by *R. palmatum*, var. *tanguticum*.

This being the case the finest varieties of Chinese rhubarb of modern commerce, including the highly esteemed extinct Russian and Turkey varieties, may be referred to *R. palmatum*, var. *tanguticum*, and not *R. officinale*, as up to the present has been done.

I may further add that in my opinion the above conclusions have resulted from the late Daniel Hanbury's forethought in supplying Mr. Rufus Usher with a veritable plant of *R. officinale* for cultivation in this country.

After the reading of the paper a discussion ensued, in which the Chairman, Secretary and Mr. R. Reynolds took part.

Mr. Elborne having replied, a hearty vote of thanks was accorded the author for his valuable paper.

The next meeting was announced for January 22, 1885, when Mr. G. Ward, F.C.S., will read a paper on "Oleic Acid and the Oleates."

Parliamentary and Law Proceedings.

Poisoning by Chlorodyne.

An inquest was held at the Guildhall, Weymouth, on the 8th inst., relative to the death of Charlotte Bennett, aged 33 years. It appeared from the evidence that the deceased was suffering from mental depression respecting religious matters and had been staying with a friend. On Friday she went out and did not return, and was eventually found on Saturday morning in a comatose condition, lying between the back of a bed and the wall in a room in her father's hotel. She had an empty glass in her hand and three empty bottles were found in the room. Medical assistance was obtained, but death ensued a few hours afterwards. The following evidence

was given as to the purchase of chlorodyne by the deceased:—

Henry John Tottles said: I am an assistant in the employ of Mr. Groves, chemist, St. Mary Street. I knew the deceased by sight as Miss Bennett. She has been to the shop on three or four occasions—the last time on the 19th of November. She then purchased a bottle of Collis Browne's chlorodyne. She did not pay for it, and it was entered to Mrs. Bennett at deceased's request. One of the bottles produced is the size that I sold her, and contained about 2 ounces. It cost 4*s.* 6*d.* She had had smaller bottles of the same medicines. On the 13th of November she bought a 1*s.* 1½*d.* bottle, which was also entered to Mrs. Bennett. Deceased always came to the shop alone. She did not say for what purpose she required it. I told Mr. Groves I had supplied deceased with these two bottles, and he directed me not to serve her with any more until he had seen her family. It is the habit of chemists to sell chlorodyne to anyone who asks for it. I have sold an 11*s.* bottle. Deceased had ordered medicine at the shop for herself before, but not of this nature. She asked me once what chlorodyne was for, when I told her it was set out on the label. She asked me if it was dangerous, and I told her it was, and that one bottle would settle her. I did not ask what she wanted it for, and she did not tell me. The label is not marked "poison."

Mr. Milledge: Although not marked poison is it not a very dangerous poison?—Yes.

The Coroner: Do you know what chlorodyne is composed of?—I do not know.

Did she request the bill to be sent to her mother?—No; but Miss Eliza Bennett called for it.

George Henley said I am assistant to Mr. Smith, chemist, of St. Thomas Street. Deceased came to the shop on the 20th of November and asked for a bottle of chlorodyne. I asked her what price she wanted, and she said 4*s.* 6*d.* She had it booked to Mrs. Bennett.

Mr. Milledge: Would you have sold her half-a-dozen bottles if she wanted?—No; because it is a poisonous preparation.

What is a dose of it?—Thirty drops.

If 30 drops are a maximum dose is there not a great deal of poison in a 4*s.* 6*d.* bottle?—Yes.

Then what security have the British public against such a poison?—There is no protection; it is a patent medicine.

The Coroner: Do you often sell bottles of chlorodyne?—Yes, 4*s.* 6*d.* bottles.

Did deceased say what she wanted it for?—No; and I did not ask her.

It is a patent medicine, is it not? What is it composed of?—We are not supposed to know. It is a private recipe of Dr. Collis Browne's.

How long have you been at Mr. Smith's?—About five months. I never sold Miss Bennett any chlorodyne before or since.

James Cartwell Rummells said: I am assistant to Mr. Stedman, chemist, of St. Thomas Street. The deceased came to the shop on the 22nd of November and asked me if I kept chlorodyne. I told her yes, and she asked the price of the bottles. I told her 1*s.* 1½*d.* and 2*s.* 9*d.*, on which she asked if I had any larger bottles. I told her we had at 4*s.* 6*d.* She wished for one of that size, which I gave her. She did not pay, but told me to enter it to Mrs. Bennett, of the Crown. I have seen her in the shop before, but not to buy chlorodyne.

Mr. Milledge: Would you have have sold her a larger quantity if she had asked for it?—Yes; because it is a patent medicine.

The Coroner: Have you ever sold a larger bottle than a 4*s.* 6*d.* one?—No.

Did you not think it extraordinary that she should ask for a 4*s.* 6*d.* bottle?—Well, not being customers of ours, I did.

Do you often sell bottles of all sizes?—Yes.

Mr. T. B. Groves here interposed by requesting the coroner to ask Mr. Tottles where he sold an 11*s.* bottle of chlorodyne?

The Coroner: Upon what ground?—Mr. Groves: Because I am his employer.

Mr. Tottles: I have not sold an 11*s.* bottle of chlorodyne since I have been in Mr. Groves's employ, but I have sold more than one of such a price before I came here.

Mr. Groves: I keep such a size, but it is only for dispensing purposes. I was afraid there might be some imputation on me that I sold an 11*s.* bottle to a private person. I only sell such a size to a surgeon for dispensing purposes.

After medical evidence had been given the Coroner summed up the case and the Jury returned the following verdict:—"That this jury, having carefully considered the evidence generally, are of opinion that the deceased died from the effects of chlorodyne which she administered personally during a fit of temporary insanity, and we desire strongly to urge that representations should be made to the proper quarter, making it necessary that chlorodyne and other patent medicines of such a potent nature should be placed under part two of the Poisons Act."

The Coroner said he would take care representations should be made to the proper quarter, suggesting that chlorodyne and other patent medicines of a similar nature should be included in part two of the Poisons Act.—*The Southern Times.*

Attempted Suicide by Poisoning.

On Monday at the Manchester County Police Court, before Sir John Iles Mantell (stipendiary magistrate), a young man named John Arthur Vayro, Hulme, was charged with attempting to commit suicide by taking a dose of chloroform. From the evidence of Mr. Levi Todd, chemist, Hulme, it appeared that on Saturday last the prisoner came to his shop about 8 p.m. and asked for a dose of chloroform. He was supplied with a drachm and a half, and left the shop. He returned about an hour later and called for a further supply. He was then given a dose of about four and a half teaspoonfuls. The prisoner then went into a neighbour's house and drank the chloroform. He became very ill, and was conveyed to the Royal Infirmary, where the house physician immediately applied the stomach-pump. After lying in a precarious condition for about three hours he was brought round. On being charged with the offence the prisoner stated that he remembered nothing about it. He was committed for trial at the sessions or the assizes.—*Manchester Evening News.*

An Amateur Medicine Dispenser.

In the Glasgow Sheriff Court an action was recently heard before Sheriff Guthrie, in which Mrs. Vernon (a widow) sued Dr. James Downie, 26, Canning Street, for £50 in respect of injuries to her health, for which she alleged the defender was responsible. On July 29 last the pursuer was suffering from a slight headache, and called at defender's shop to get something to cure her. The defender's wife, who was in charge at the time, supplied the pursuer with a powder for which she paid 2*d.* The pursuer dissolved the powder in water and drank it. Before half an hour had elapsed she became sick, and a few hours later she was seized with vomitings, which continued through the night and the next day till medical aid brought her relief. The doctor who was called to her assistance, and who attended her for some time afterwards, gave it as his opinion that she suffered from mercurial salivation. The pursuer avers that her illness was the result of drinking the powder, and of the culpable neglect and fault of the person in attendance in defender's shop, in respect that she supplied the pursuer with a powder containing a quantity of mercury calculated to be highly injurious to her health and person. The pursuer's illness, it was stated in her condescendence

kept her in bed for several weeks and still prevents her attending to her work as formerly; her gums have been permanently injured, and her teeth have been loosened and are falling out in consequence of the salivation produced by said powder. The pursuer's legal plea was that the injuries sustained having been caused by the culpable negligence or fault of the defender's wife, while acting in the capacity of his assistant or servant, and for whom he was responsible, he was liable to pursuer in reparation therefor; that the pursuer being entitled to rely on the skill and experience of the person in attendance, and her illness having been the result of the gross negligence and fault of said person, she was entitled to damages for the injury to her health.

The defender, on the other hand, averred that the powder with which the pursuer was supplied had in it no unusual ingredients either in respect of quantity or substance, and that if the pursuer became ill after taking it, which was not admitted, her illness must have arisen from something else she had taken, or from some peculiarity of her then physical condition, or from the medicine being unsuitable for her ailment, or from some other cause to the defender unknown. The defender explained in his statement submitted to the Court that his regular assistant was absent at dinner when the pursuer called, and that he himself was in almost constant attendance daily, and superintended the dispensing of all drugs. During the last few years his wife had occasionally relieved the assistant at his meal hours, and helped in the shop at other times. His wife, however, had no authority from him to prescribe for the ailments of persons coming into the shop or to supply customers with drugs which in her judgment were suitable for particular purposes. The pursuer, he argued, therefore took the risk of the suitability of the powder sold to her. Further, the defender pleaded that his wife, not having acted in the sale by any delegated authority from him, he was not liable for any alleged error committed by her, and that the pursuer having bought the powder in reliance on the skill of an unqualified person had no claim against him.

Sheriff Guthrie, in his judgment, dismisses the action, and finds the pursuer liable in expenses. His lordship in his note points out that it was nowhere averred that the defender's wife was authorized or delegated by the defender to prescribe for patients or customers, or to give medical advice, or even that he was aware that she or his other assistants were in the habit of doing so. It was clear law, the Sheriff remarked, that a master or principal was answerable for all wrongs which a servant or agent committed in the course of the employment, and for the principal's benefit, though without his knowledge or privity. He did not authorize the particular act, but he put the agent in his place to do that class of acts, and he must be answerable for the manner in which the agent has conducted himself in doing the business which the master or principal placed him in. It did not appear to be any part of the defender's servants' powers or duties to act as a medical adviser to persons coming to the shop, and if the servant took upon himself or herself to do so, the employer was no more liable for his or her blunder than a master would be for the recklessness of a coachman who took the use of his carriage for his own purposes without permission. It could make no difference that in this case the employer was a medical man himself, and there was no reason for presuming—at least in the present state of the women's rights movement—that a lady left by her husband in charge of the dispensary was a qualified medical practitioner. A person who sought medical advice from a salesman in a chemist's shop was himself chiefly to blame if he got into trouble. He might just possibly have a claim of damages against the salesman if he incautiously prescribed for him, but he had no recourse against the employer, who had put the salesman there for certain well understood and limited purposes. It might be thought possible to bring a case of this kind within the rules as to warranties and representations made by servants employed to sell, but it was not so put in the condescendence, and his lordship would be exceedingly slow to hold that any servant or wife in a shop could have power to bind the principal by warranties. The Sheriff, in concluding the note, says that he has thought it desirable to suggest the rules that must be attended to by those who sought to rear a vicarious liability of this kind against druggists or dispensing medical practitioners.—*Glasgow Herald.*

Singular Attempt to Poison a Father.

A young man named Francis Osborne is in custody at Derby on a charge of having attempted to poison his father, a farmer. Prisoner went home the worse for drink and asked his father for money, which was refused. He then took away the cheese from which his father was about to take his supper. Returning in a few minutes he placed the cheese again on the table. Mr. Osborne noticed that it looked bright, and asked him what he had been doing to it. He said he had done nothing, and that good cheese always looked bright. The father did not eat any cheese, and the prisoner, after cutting a piece off, went away. It was found that a quantity of oxalic acid had been rubbed on the cheese, and next morning the prisoner was arrested. He said he had done it for a lark. A packet of oxalic acid and a bottle of poison were found in the young man's bedroom.—*Manchester Evening News.*

Obituary.

Notice has been received of the death of the following:—

On the 22nd of May, Mr. Alexander Douglas, Chemist and Druggist, Dunblane. Aged 42 years. Mr. Douglas had been a member of the Pharmaceutical Society since 1878.

On the 26th of September, Mr. Reuben Strickland Rice, Chemist and Druggist, Leicester. Aged 33 years.

On the 4th of October, Mr. Frederick William Jones, Pharmaceutical Chemist, Norton Folgate, London. Aged 37 years. Mr. Jones had been a Member of the Pharmaceutical Society since 1869.

On the 21st of October, Mr. John Smith, Chemist and Druggist, Barnet. Aged 37 years.

On the 23rd of November, Mr. William Lamacraft, Chemist and Druggist, High Street, Putney, London. Aged 61 years.

On the 24th of November, Mr. William Henry Fitzhugh, Chemist and Druggist, Bedford. Aged 24 years.

On the 25th of November, Mr. Thomas James Greatrex, Chemist and Druggist, Liverpool. Aged 40 years.

On the 2nd of December, Mr. Thomas Gristock, Pharmaceutical Chemist, South Street, Manchester Square, London. Aged 64 years.

On the 3rd of December, Mr. Joseph Noad, Chemist and Druggist, Reading. Aged 34 years. Mr. Noad had been connected with the Pharmaceutical Society since 1869.

On the 3rd of December, Mr. Robert Roberts, Chemist and Druggist, Norwich. Aged 49 years.

On the 4th of December, Mr. Charles Lynham Perkins, Chemist and Druggist, Torpoint. Aged 23 years. Mr. Perkins had been connected with the Pharmaceutical Society since 1876.

On the 8th of December, Mr. Henry Cross, Pharmaceutical Chemist, Effra Parade, Brixton, London, Aged 63 years.

Review.

NOTES ON MATERIA MEDICA AND PHARMACY. By F. T. ROBERTS, M.D., B.Sc., F.R.C.P.*

This new manual hardly comes within the range of ordinary criticism, as it is intended not as a treatise on the subject, but as a note-book arranged by a well practised lecturer and examiner. The notes included in the volume are founded upon lectures delivered from time to time as part of the course on materia medica at University College: their publication was in order to set the author free in future to devote himself exclusively to therapeutics.

The result is what might have been expected from one perfectly conversant with his subject; the beginner is put in possession of concise, connected, abstract information respecting the various substances which are recognized as belonging to this branch of medicine; and, whatever can be done in the way of classification, grouping and tabulation is effected in these pages. It is assumed that the student (those preparing for a medical career are primarily addressed) is already familiar with the chemistry and methods of testing as contained in the British Pharmacopœia, and further reference to those tests is therefore omitted.

The introduction indicates the system of study adopted with reference either to pharmacy in general, or to separate drugs, and one uniform plan regulates the whole book. This is specially exemplified in the section which treats of the organic kingdom, where tabulation and grouping have been carried out in a most elaborate manner.

It is curious that the very few typographical errors concern the important matter of weights and measures. *For* librum *read* libra; *for* scrupulum *read* scrupulus (the balance of authority is in favour of this reading), and *for* congium *read* congius. (p. 4.)

Students approach their work in very different manners; personally we should imagine that this book would prove most valuable as an aid to memory, to be used both as a reference manual, and as an admirably constructed recapitulation of facts necessary to be recollected.

* London: H. K. Lewis. 1884. Fcap. 8vo. Pp. i-vii., 1-380. 7*s.* 6*d.*

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE LOCAL GOVERNMENT BOARD REPORT.

Sir,—Your ready protest against the unfair inferences which have been deduced from that portion of the Local Government report upon the analysts' returns which refers especially to the adulteration of drugs, will undoubtedly be appreciated by every pharmacist in the country.

That your objections to the vague nature of the data upon which charges of the most serious nature are founded should have appeared at the earliest possible opportunity is a special matter for congratulation, seeing that in the corresponding issue of the *Lancet* imputations are repeated, which must rest upon a "whole class of honourable men," in language which is simply deplorable.

Whilst it is easy to pardon the lay sections of the press for endeavouring to extract a little padding from matter with which they are profoundly ignorant, it is not so easy to pardon or even to excuse those who should know better. When an important journal, written professedly in the interest of medical science, hastily gives credence to misleading statistics and goes so far as to comment upon them in a manner imputing to every chemist actual dishonesty in the exercise of his vocation, it is indeed time to demand with no uncertain voice such a rectification of the report in question as will lead to the withdrawal of such disgraceful charges.

Kilburn. CHARLES B. ALLEN.

LIQUID EXTRACT OF CINCHONA.

Sir,—In reply to the editorial note appended to my letter in last week's *Pharmaceutical Journal* allow me to say that Dr. Hager has entirely misconceived Dr. De Vrij's directions in the article referred to. He has evidently mixed up the directions for the preliminary examination of the bark to be operated upon with its subsequent treatment in the manufacture of fluid extract.

But why refer to Hager when Dr. De Vrij's own clear instructions are before us? Six years ago this very day Dr. De Vrij wrote and published as follows:—"The exact quantity (of hydrochloric acid) is calculated from the known percentage of total alkaloids in the bark. For each 3·2 grams of alkaloids contained in the bark one must use 20 c.c. standard solution of HCl (containing 36·5 grams of HCl per litre). If, for instance, one uses for this preparation 100 grams of Java succirubra bark containing 7 per cent. of alkaloids, then 43·7 c.c. of standard HCl must be used." And I am now requested by Dr. De Vrij to state that he has not made or authorized any alteration in his process as thus described.

Any persons may for themselves calculate out the above proportions of hydrochloric acid and bark, and they will find them to be, as previously represented by me, identical with those proposed by Professor Redwood.

It is remarkable that Professor Redwood should have so exactly reproduced Dr. De Vrij's formula in all its essential characters by a perfectly independent investigation; but there is no doubt that it is so, and it is a matter for congratulation that the most experienced pharmacist in England should have thus confirmed the earlier conclusions of the most experienced quinologist in Europe. By this happy concord the vexed question of fluid extract of cinchona is in a fair way to a satisfactory issue.

RICHD. W. GILES.

[*** We do not wish to question Mr. Giles as an authority having special inspiration in respect to Dr. De Vrij's process, and thought we had intimated as much last week, although we referred to a recent edition of a standard work from which we had drawn our conclusion. But we may be pardoned for pointing out that in reference to Professor Redwood's statement that the quantity of hydrochloric acid used by him was sufficient to ensure the entire removal of the alkaloids, Mr. Giles has declared in the most unqualified manner that "he doubted that statement entirely." So that if Dr. De Vrij's process does correspond so completely as is now claimed with that recommended by Professor Redwood it follows that Mr. Giles's doubts apply to the one as well as to the other.—ED. PHARM. JOURN.]

"*Associate.*"—(1) Strictly speaking the labels would require a stamp, and under present circumstances it would not be safe to use them without receiving the permission of the inland revenue authorities, to whom you should apply. (2) They would be subject to stamp duty on more than one ground. (3) We think such information can hardly be conveyed in a book.

"*Chemicus.*"—Upon the subject of the composition of chlorodyne see *Pharm. Journ.*, [2], xi., 280, 417, 481, 663, etc.

F. C.—(1) Your question should have been addressed to a medical journal. (2) Apply to the Secretary to the Association.

H. Lugar.—Your very interesting specimen has been received and will form the subject of a note in "The Month" in next week's Journal.

Inquirer. — In Squire's 'Companion' the followlng formula is given for "Extractum liquidum gummi rubri":—Red gum, 7; water, 21; dissolve, strain and add rectified spirit, 1.

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Fig. 8.

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Fig. 100.

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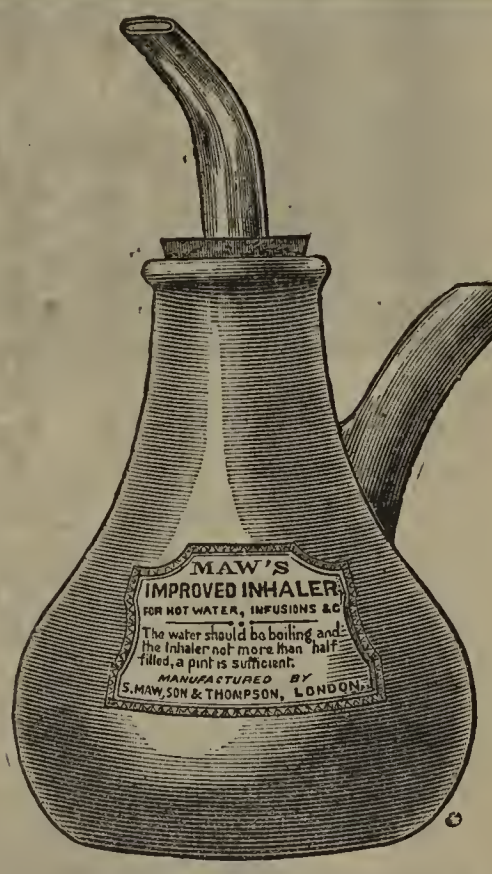

Fig. 8A.

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Fig. 8:—Marbled, 32s. per dozen.

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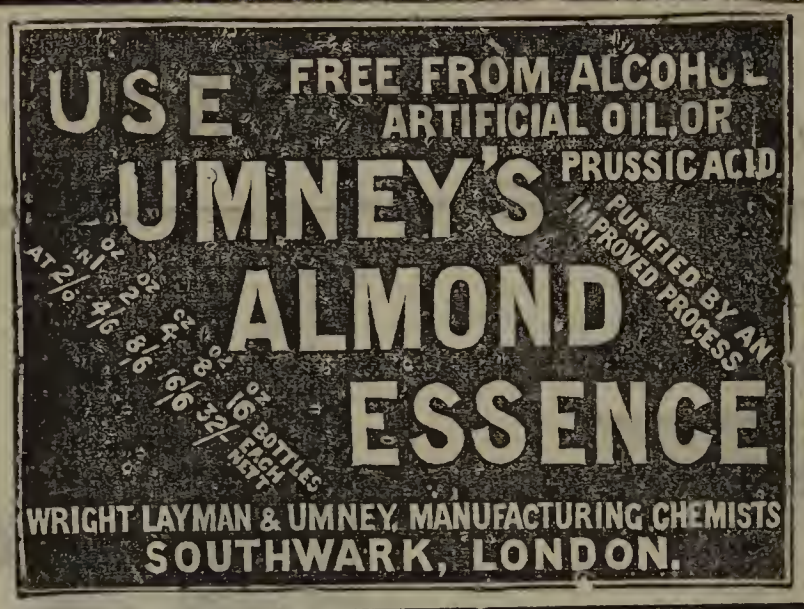

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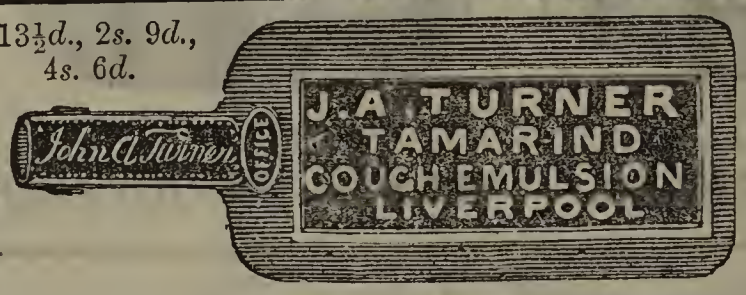

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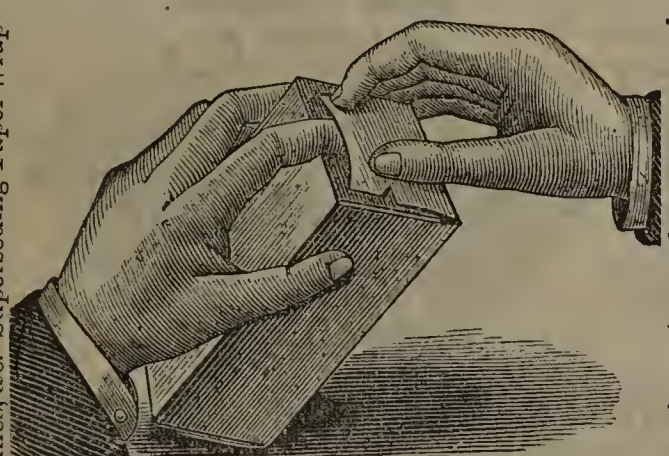

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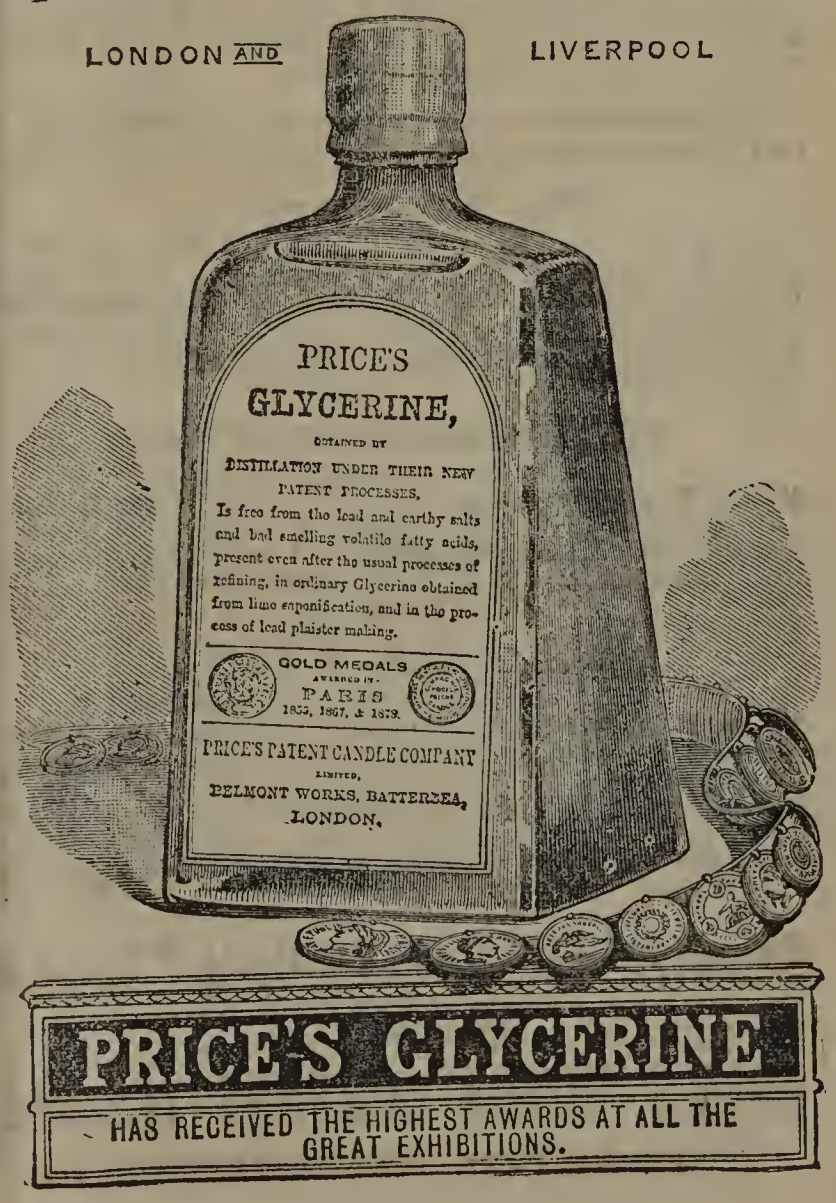

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All crushed in our own mills. Samples and special quotations on application.
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EQUAL TO AND CHEAPER THAN VASELINE.
SANITARY FLUID AND SHEEP DIP,
THE CHEAPEST AND BEST DISINFECTANT.
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REDUCED PRICES:

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SEVENTEENTH SESSION, 1884-5.

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N.B.—All fees are payable in advance, and are inclusive, no extra charge whatever being made. Students who join for one or two months pay full fees to all classes, but those who join for longer times are allowed a reduction of 10 to 15 per cent. on the fee. This offers a great advantage to those who join for the longer periods, and also gives them a better prospect of success in their respective examinations.

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Laboratory and School Buildings:

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Fees to the February Examination, 6 guineas; to April, 10 guineas; or the fee from January 2nd to July 16th is 15 guineas.

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NOTICE TO ADVERTISERS.

On account of the occurrence of Christmas Day in the ensuing week, the Pharmaceutical Journal will be published on Wednesday, the 24th inst. Advertisements must reach the Office not later than Ten o'clock on Tuesday morning, the 23rd inst.

PHARMACEUTICAL PRELIMINARY, LONDON MATRICULATION, AND ALL MEDICAL PRELIMINARIES.

RAPID and thorough preparation, privately and in class. Postal Tuition for these Examinations and Bell Scholarship. For particulars, enclose stamp, Mr. A. Dawes, 1st B.A. Lond., Adderstone, Vardens Rd., New Wandsworth, S.W. (close to Clapham Junction Station).

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AS Manager, Assistant, or other. Good and varied experience. Satisfactory references. Permanency required. B. T., 12, Foubert's Pl., Regent St., W.

AS Junior (where several are kept), or Assistant, in light Retail and Dispensing business. Minor and Hall qualifications. Age 22. Height 5ft. 8in. W. Ballard, Park Rd., Abingdon.

AS Junior. Disengaged 2nd ult. Age 20. 5½ years' experience. Good references. State hours to J. E. H., Mr. F. Griffith, Chemist, Chichester.

ENGAGEMENTS WANTED.

AFTER Christmas.—By a Major Student, an Evening engagement, in or out-door. Near Wills's preferred. State fullest particulars to S., Almora, Warren Rd., Torquay.

APPRENTICESHIP.—Youth, well educated, wishes for situation in February next, for 3 years, in a good class business. Fair premium. London preferred. W. Bradley, St. Bart's, Sandwich, Kent.

AS out-door Assistant, in good Dispensing and light Retail. Age 24. 8 years' experience. Good references, town and country. Disengaged. J. Halliwell Morley Hall, Crowle, viâ Doncaster.

TO Manage Branch or as Senior. Qualified. Age 27. 10 years' experience. Good references. Neighbourhood of London or South England preferred. Cecil Bishop, Downside, Brading, Isle of Wight.

TEMPORARY engagement until end of February. In or out-door. Age 23. 6 years' London experience. O. G., 78, Gracechurch St., E.C.

TEMPORARY Assistant or Manager. Retired Chemist, 42, desires employment as above, in Liverpool. Disengaged January 5th. Chemist, 432, New Chester Rd., Rock Ferry.

AS Junior or Improver, or Dispenser to a Surgeon. In-doors. 5 years' experience. Age 20. T. W. P., 57, Upgate, Louth, Lincs.

AS Junior to sharp Retail Dispensing business. Neat and accurate Dispenser. 4 years' experience. Age 21. Height 5ft. 9in. Satisfactory references. W. Tate, E. H. Griffiths, Chemist, Kidsgrove.

AS Branch Manager, out-door Assistant, or Dispenser to a Surgeon. Age 30. Married. 14 years' experience. Good Dispenser and Prescriber. Excellent refcrence. Disengaged. Manager, 16, Fairfax St., York.

AS out-doors or to Manage. Good Dispenser and Prescriber. Can Extract Teeth. 19 years' varied experience. Married. Chemist, 53, Cobourg St., Leeds.

MANAGER.—Branch or for widow lady. First-class references and experience. Good appearance. Disengaged 14th January. J. R., Messrs. Evans, Lescher & Co., 60, Bartholomew Close.

AS Assistant. Out-door. Married. Passed Major. Good experience and references. Or as Locum Tenens in London. State all particulars to M. P. S., 29, Walsingham Rd., Upper Clapton, E.

AS Assistant or Manager. Out-door. Age 27. 11 years' experience. Good references. Disengaged shortly. H. Saunders, Spilsby, Lincs.

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LOCUM Tenens by a Minor Student. Terms 35s. per week. Disengaged 18th instant. Vaseline, 226, Marylebone Rd., N.W.

AS Assistant, in first-class Dispensing business. 6½ years' experience. F. E. Brown, 4, Anglesea Ter., Ipswich.

AS Junior. 3½ years' experience. Age 19. Passed Prelim. Height 5ft. 8¼in. Able to Dispense, &c. Good refcrences. Apply in first instance. D. Jones, Lygon Pharmacy, Gt. Malvern.

AS Manager or out-door Assistant. Age 32. Married. Good Prescriber and Counterman. West-end experience. Speaks French and German. Chemist, 24, Moreton Pl., Belgrave Rd.

LOCUM Tenens by the day, week or month. Disengaged January 5th. Terms moderate. A. B., Butler's Hall, Whepstead, near Bury St. Edmunds.

ENGAGEMENTS WANTED.

AS JUNIOR in a provincial town. Apply and refer to GOSTLING & Co., Diss.

TO Surgeons and Chemists, whole or partial employment. Well up in Retail, Counter Prescribing, Dispensary practice, &c. Disengaged now. X., 36, Great Eastern St., E.C.

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AS JUNIOR. Age 21. Height 5ft. 8in. Good address. Can Prescribe and Extract Teeth. Good reference. 4 years' experience. Disengaged January 1st. ARTHUR GRANT, Tregenna Pl., Saint Ives, Cornwall.

ASSISTANTS WANTED.

A TRUSTWORTHY and gentlemanly out-door ASSISTANT, for a country Mixed business. Age from 23 to 30. Competent to take charge in the absence of principal. One desiring a permanency preferred. Good references required. Apply to W. CLARKE, Chemist, Stockton-on-Tees.

FOR Sheffield.—An out-door ASSISTANT, about 25 years of age. Part of whose time would be taken up with Town Travelling amongst small shopkeepers. Good references are indispensable. Apply, stating age and salary required to commence with, to J. B., care of Jas. Woolley, Son & Co., Manchester.

A DISPENSER for the St. John's Wood and Portland Town Dispensary. Salary £80 per year, with house, coals and gas. Application to be made at once, to Mr. BRAZIER, at the Dispensary, 1, Henstridge Villas, Ordnance Rd., N.W., from whom the duties can be ascertained. Preference would be given to a married man without family.

EARLY in January.—For a good class suburban business, where one only is kept, an ASSISTANT, about 25, possessing the Minor qualification at least. One wishing for a permanency preferred. Application must be by letter in first instance, W. H. SYMONS, St. John's Wood, N.W.

A JUNIOR, about 19. Early in January. Close at 8. No Sunday work. Write, stating age, experience, and salary required, R. E. CHARLES, Chemist, Brecon.

OUT-DOOR ASSISTANT, for country trade, age 21 to 24. Qualified preferred. Middle January. State salary. STURTON, Fitzroy St., Cambridge.

THE services of a qualified ASSISTANT required to take charge of large Retail establishment. Liberal salary will be given for a thoroughly competent man. Apply by letter only, stating past experience, age, and salary required, to S. J. M., care of Mr. Samson, 9, Perham Rd., West Kensington, S.W.

IMMEDIATELY.—A young man, about 20 years of age, accustomed to a brisk Retail and Prescribing business. To board in and sleep out. One seeking a permanency, with first-class references. Apply personally, to W. M. COVELL, Dispensing Chemist, 302, Mare St., Hackney, E.

MALTA.—ASSISTANT, with Minor qualification. Must be well up in the business and of sober and gentlemanly habits. Apply to HODGKINSONS, STEAD & TREACHER, 198, Upper Whitecross St., E.C.

EARLY in January. A competent DISPENSER in a West-end house, where five Assistants are kept. Address, W., care of Messrs. Maw, Son & Thompson, 11, Aldersgate St., E.C.

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A JUNIOR ASSISTANT for a Mixed business. Must have good character for steadiness and honesty. No heavy work. Address, with photo., to I. G., care of Woolley, Sons & Co., Manchester.

A COMPETENT and obliging ASSISTANT for a good Dispensing and Family business in Yorkshire. State age, references, salary required, and enclose carte, if convenient. C., Messrs. Barron, Harveys & Co., Gilt-spur St., E.C.

A THOROUGHLY trustworthy and gentlemanly ASSISTANT, about 22, competent to take charge in the absence of principal, or to Manage a Branch. A qualified man preferred. Also a gentlemanly youth as an in-door APPRENTICE. Apply, with full particulars, and photo. (to be returned), to EDMUND JONES, Chemist, Hanley, Staffs.

IMMEDIATELY.—A qualified ASSISTANT, to take charge of a light Retail business. Single. In-door. Good salary given to a suitable person. Preference given to a total abstainer. Apply, with particulars as to references, age, &c., to CHEMIST, Ferndale, Pontypridd.

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IMMEDIATELY.—By a Firm of Surgeons, in a large good class practice, an ASSISTANT (unmarried), with Minor qualification, to Dispense and Keep the Books. Out-door. Liberal salary. Apply by letter only, in own handwriting, stating age and giving references, with copies of testimonials, MEDICUS, Mr. Golding, 10, Minster St., Reading.

DISPENSER, for a small Institution, in London. Duties, which are very light, to commence on January 10th. Salary £50, non-resident. Allows plenty of spare time for study. Application by letter, with copies only of testimonials, to F. J., care of Messrs. Charles Barker & Sons, 8, Birchin Lane, E.C.

A JUNIOR, in a good class Retail and Dispensing business. Must be neat and accurate, and gentlemanly in manners and address. Apply to THOS. MACCRINDLE, Chemist, High Rd., Lower Tottenham.

A GOOD JUNIOR (single handed) for a country business. Apply, stating usual particulars, to M. R., care of Messrs. Hodgkinson & Co., 198, Whitecross St., London, E.C.

JANUARY 1st. Two smart JUNIORS, who must be of active business habits. Alternate afternoons for study, with one evening weekly and one day monthly. Salary £30, and a comfortable home. Those desiring a permanency. Apply to RALPH HALL, The Kingsland Pharmacy, 552, Kingsland Rd., N.E.

BY the 2nd week in January.—A good Junior ASSISTANT. About 24. Accustomed to Dispensing and a Mixed business. Preference given to one with a knowledge of the Welsh language. Apply with references and salary required to Mrs. WHITE, Chemist, &c., Mountain Ash, Glamorganshire.

COMPETENT ASSISTANT, about 23, in a good class Retail and Dispensing suburban business. Must be quick and accurate Dispenser, with good address. Apply to C. SAUNDERS, North Rd., Highgate, N.

AS MANAGER. A gentleman from 35 to 45. Must be well up in Prescribing and a good Counterman, a quick and accurate Dispenser, and not afraid of work. Good salary to a suitable man. J. ASHTON, Chemis 378, Cold Harbour Lane, Brixton Station.

ASSISTANTS WANTED.

FOR a village Mixed business. A qualified middle-aged man. Apply to GOSTLING & Co., Diss.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 757.] SATURDAY, DECEMBER 27, 1884. [PRICE FOURPENCE

TABLE OF CONTENTS.

Page
"The Month" 501
Amyl Nitris. By Dr. Squibb (*concluded*) 505
The Collection of Brazilian Drugs at the Vienna Exhibition 507

EDITORIAL ARTICLES AND NOTES :—
A Contribution to the History of Disinfectants 509
Notes :—An Assistant convicted of Manslaughter — Sixth International Pharmaceutical Congress—Award of Graham Medal to Mr. Stanford — Pharmacopœia Committee for Switzerland—Japanese Animal Materia Medica—Japanese Camphor—Commemoration of the Visit of the British Association to Canada 510

PROVINCIAL TRANSACTIONS :—
Edinburgh Chemists' Assistants and Apprentices' Association :—
The Life of a Plant. By Thomas Stephenson 511

PROCEEDINGS OF SCIENTIFIC SOCIETIES :—
Chemical Society 514
British Pharmaceutical Conference .. 514
School of Pharmacy Students' Association :—
Ionidium Ipecacuanha. By J. B. Barnes, Jun. 515
Chemists' Assistants' Association .. 516
Society of Arts :—
Mr. Ernest Hart on the International Health Exhibition 516

REVIEW :—
Hirsch's 'Universal Pharmakopöe' .. 519

CORRESPONDENCE :—
Another Ureometer 520
A Botanical Problem 520
Answers to Correspondents 520

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar

NOTICES.

LIBRARY AND MUSEUM.

SPECIAL NOTICE.

The Library and Museum will be closed from 2 p.m. on Wednesday, December 24th, until 9 a.m. on Monday, December 29th, and will not be open in the Evening from Monday, December 29th, to Thursday, January 1st, both dates inclusive.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the second Tuesday in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

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MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

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SPECIAL NOTE.

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INDEX TO ADVERTISEMENTS.

		Page
ALLEN & HANBURYS	Jujubes	4
ALLSWORTH, N.	Instructions in Pill Coating	19
APOLLINARIS CO. (Ld.)	Hunyadi Janos	13
ASSISTANTS WANTED		18
BENNETTE, H.	Chemists' Valuer	19
BETTS & CO. (Ld.)	Metallic Capsules, &c.	5
BEWLEY & DRAPER (Ld.)	Drapers' Ink	8
BOLE HALL MILL CO.	Surgical Bandage	15
BOUDAULT, H.	Pepsine	8
BOWLES & CROSS	Printers	16
BRAND & CO.	Notice and Caution	6
BRETT, F. J.	Transfer Agency	19
BURROUGH	Spirits of Wine	8
BURROUGHS, WELLCOME & CO.	Kepler Malt Extract	7
BUSINESSES for DISPOSAL		18
CENTRAL SCHOOL of CHEMISTRY and PHARMACY		16
CHEMISTS' BALL (The)		3
CHRISTY, T., & CO.	Menthol Cones	12
CHURCHILL, J. & A.	Squire's Companion	2
CUPISS	Constitution Balls	15
DAWES, A.	Tutor	16
DE VRIJ'S CINCHONA CO.	Ext. Cinchonæ Liquidum	8
EDINBURGH SCHOOL of PHARMACY		17
ENGAGEMENTS WANTED		17
FAIRMAN & CO.	Chemists' Cases	14
FERRIS & CO.	Nepenthe	9
FIELD, J. C. & J.	Samphire Soap	10
GILES, SCHACHT & CO.	Pharmaceutical Preparations	12
GRADUATED COUNTY SCHOOLS ASSOCIATION (Ld.)		19
GRINDLEY & CO.	Petroleum Jelly	15
HARRISON, W. B.	Mineral Waters and Ice	13
HODSON, J. C.	Mechanical Dentist	19
HOGE'S HONEY CO. (Ld.)	Horehound Honey	14
HOGG & SON	Mineral Waters	13
HOWARDS & SONS	Quinine, Pharmaceutical and other Chemicals	9
HUGHES, E. G.	Fir Tree Oil	12
HUGHES, W.	Magic Lanterns	15
ISAACS, I., & CO	Dispensing Bottles	4
JUDD, H.	Classes	16
KEMP, W., & SON	Crushed Linseed, &c.	13
KILNER BROS.	Bottles	15
KIMPTON, H.	Books	2
MACKEY, MACKEY & CO.	Pharmaceutical Preparations	11
MAW, SON & THOMPSON	Trade Notice	5
MAY & BAKER	Manufacturing Chemists	20
MENTHOL CONES DEPOT	Menthol Cones	6
MURRAY, SIR JAS.	Fluid Magnesia	13
NATALI, E.	Shop Fittings	18
OPPEL, C., & CO.	Friedrichshall Bitter Water	4
OPPENHEIMER BROS. & CO.	Liq. Euonymin et Pepsin Comp	12
ORRIDGE & CO.	Transfer Agency	19
PHARMACEUTICAL SOCIETY of GREAT BRITAIN	Official Notices	1
PICKERING, J., & SONS	Polishing Paste, &c., &c.	14
POWELL, T.	Balsam of Aniseed	13
ROBINSON, G. H.	500 Practical Trade Receipts	2
SAINSBURY, S.	Lavender Water	15
SANFORD & SON	Rat and Mice Poison	16
SANJANA CO.	Sanjana Essence, &c.	7
SAUNDERS, J.	Private Tutor	12
SILVERLOCK, H.	Almanacks	6
SMITH, BUTLER	Tutor	16
SOUTH LONDON SCHOOL of PHARMACY		16
SYMES & CO.	Lac Bismuthi	15
TERMS for ADVERTISEMENTS		15
THOMPSON, MILLARD & CO. (Ld.)	Feeding Bottles	11
WALKER & DALRYMPLE	Chemists' Tea Agency	12
WESTMINSTER COLLEGE of CHEMISTRY and PHARMACY		17
WILLS & WOOTTON	Postal System of Instruction	16
WOODS	Areca Nut Tooth Paste	12
WOOLLEY, J., SONS & CO.	Spiritus Ætheris Nitrosi, &c.	6
WRIGHT, LAYMAN & UMNEY	Almond Essence	13
WRIGHT, LAYMAN & UMNEY	Essential Oil of Camphor	4
YOUNG, H.	Arnicated Corn and Bunion Plasters	14

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On account of the occurrence of Christmas Day this week, the "Pharmaceutical Journal" is published on Wednesday instead of Friday. Advertisements received after ten o'clock on Tuesday Morning were too late for insertion in this week's issue, but they shall appear in the next number.

THE CHEMISTS'
NINETEENTH ANNUAL BALL
AT
WILLIS'S ROOMS, KING STREET, ST. JAMES'S,
ON WEDNESDAY, JANUARY 14*th*, 1885.

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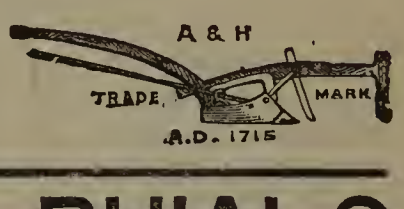

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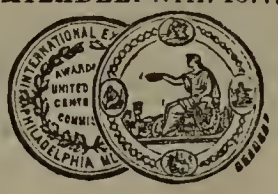
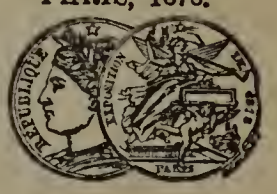

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NEPENTHE.

FERRIS & CO. *v.* GOODMAN.

Notice is hereby given, that by an Order of the Chancery Division of the High Court of Justice, made the 18th day of July, 1884, in the above action, it was ordered that the Defendant and others be **perpetually restrained** from selling, or offering for sale, any formula or recipe for "**Nepenthe**," and from otherwise prejudicing the sale thereof by, or injuring the title thereto, or Trade Mark therein, of the Plaintiffs, Messrs. FERRIS & Co., of Bristol, Wholesale Druggists, the **Registered Proprietors thereof.**

And it was further ordered that the Defendant do pay the costs of the said action.

Dated this 12th day of August, 1884.

(Signed) CHILTON & GREEN-ARMYTAGE, Bristol,
Solicitors for the said Plaintiffs.

I.H.E. 1884.

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"THE MONTH."

In a paper read before the Royal Society on the 11th inst. (*Chem. News*, Dec. 19, p. 287) Professor Hartley puts forward the rather startling proposition that "drugs of such potency as aconitine, morphine, quinine, strychnine, etc., which ought to be prescribed only when of absolute purity, should have their exact nature and degree of purity guaranteed by an examination of their absorption spectra." This opinion appears to be based upon the results of a number of experiments made to determine whether the action of solutions of different alkaloids on the ultra-violet rays could be utilized as a means of distinguishing one from another. The apparatus employed afforded a spectrum extending from wave-length 4414·5 to 2145·8, and it was found that the alkaloids examined could be divided into two groups, those which exhibit spectra with absorption bands and those with continuous spectra. In illustration of the conclusions arrived at, Professor Hartley says that the different character of the various specimens known as "aconitines" may be recognized. Thus he says the comparatively "harmless" base (which is described in the lists given as "foreign aconitine") may be distinguished from those of great physiological activity ("aconitine," "pseudaconitine" and "japaconitine") by its transmission of a continuous spectrum, the physiologically active aconitines being distinguishable from one another by their characteristic absorption bands. It might be suggested that "aconitine (foreign)" is hardly so precise a definition as could be desired in a research aspiring to such exact results. Quinine, cinchonine, quinidine and cinchonidine are all included among the alkaloids that exhibit absorption bands in their spectra; but cinchonine is said to be so much more diactinic than quinine that an admixture of the former with the latter can easily be determined. It would perhaps be premature, until the paper is published *in extenso*, to pronounce a decided opinion, but it would seem improbable to any one except an expert in spectroscopy that this method is likely to displace chemical methods in testing the purity of such compounds, though it seems likely to throw light upon the constitutions of organic compounds. For it has been found that bases which contain oxidized radicals, as hydroxyl, carboxyl or methoxyl, diminish in diactinic quality in proportion to the amount of oxygen they contain. The apo-derivatives also are less diactinic to a degree which is considered to indicate that their molecular weights have been nearly doubled. There also appears to be a characteristic difference between the behaviour of compounds having a pyridine or chinoline nucleus and those having a benzene nucleus.

The Pharmacopœia Committee appointed by the German Pharmaceutical Association having decided to recommend that hydrochlorate of cocaine should be included in the next edition of the Pharmacopœa Germanica, and drawn up the "characters and tests," it may be useful just now to quote this *quasi*-official account of the remedy which has so suddenly taken an important place in the materia medica. The salt is defined as a white crystalline powder of weakly acid reaction, with a somewhat bitter taste, and producing in the tongue a highly characteristic insensibility that quickly passes away. The salt dissolves easily in water and in alcohol. In the aqueous solution a solution of iodine produces a red brown precipitate, and caustic alkalies a white crystalline precipitate, which redissolves with great difficulty in water, but readily in alcohol or ether. The compound is dissolved with frothing by concentrated sulphuric acid, but without undergoing change of colour; nitric and hydrochloric acids also dissolve it colourless. When heated upon platinum foil hydrochlorate of cocaine should leave no residue; it should dissolve in double its weight of cold water, and should not become coloured in contact with mineral acids.

The hydrochlorate of cocaine and fluid extract of coca have been lately used at Westminster Hospital to procure sleep. In one patient three minims of a 4 per cent. solution, equal to $\frac{1}{8}$ of a grain, administered hypodermically produced sleep. Two drachms of fluid extract of the leaves were required to produce the same effect, producing natural and undisturbed sleep. In a case of rheumatism the dose of hydrochlorate of cocaine was increased to six minims injected subcutaneously ($\frac{1}{4}$ of a grain), and the fluid extract was given to the extent of five drachms for a dose without any bad effect. It may be here mentioned that the term "valoid" is coming into use as a term for a fluid extract which represents an equivalent weight of the pure drug (*Brit. Med. Journ.*, Dec. 20, p. 1240). The hydrochlorate of cocaine has also been used successfully for tinnitus aurium, a 4 per cent. solution being dropped into the ear.

Another suggestive case of the possible use of cocaine hydrochlorate is reported in the *Medical Times* (Nov. 29, p. 755). The patient suffered from tubercular disease, and for nearly two months had only been able to swallow even milk in the minutest quantities, deglutition being so extremely painful. After his throat had been painted with solution of cocaine, he was able to make an excellent meal.

According to Dr. C. Brame (*Répertoire*, Dec., p. 537), oil of peppermint forms a useful application to burns, easing the pain immediately. The part burned is first immersed in water and then the oil is painted on with a fine camel hair pencil.

Dr. Ernst, of Zurich, reports (*Répertoire*, Dec., p. 563) that he has observed in five cases the occurrence of exanthema during the administration of the new antipyretic, "antipyrin." The eruption, which occurred on the chest, stomach and back, is described as consisting of small, reddish, irregularly circular spots, resembling pretty closely those of rubeola. The spots are confluent and the patches formed, being separated by divisions of sound skin, present the appearance of a rose marbling. When pressed the red colour disappears leaving a brown pigmentation. The eruption increases in intensity of colour for about five days, when the red gives way to a brown colour. and, after a time, the exanthema disappears without the administration of antipyrin being discontinued.

In the *Practitioner* for December (p. 409) Dr. R. Roberts, assistant in the Pharmacological Institute, Strassburg, describes the active principles of ergot as ergotinic acid, sphacelinic acid and cornutin, thus adding three new names to the already numerous and intricate list of active principles of this drug. The ergotinic acid (a glucosidic acid) is obtained by precipitating the watery extract of ergot with neutral acetate of lead and adding to the filtrate an ammoniated solution of acetate of lead, when ergotinate of lead is precipitated. This body he considers to be the active ingredient in Bonjean's ergotine, Wernisch's dialysed

ergotine, and of the sclerotinic acid of Dragendorff and Podwissotzki. Sphacelinic acid is obtained by extracting the ergot with absolute alcohol after the ergotinic acid and alkaloids have been removed, but it must then be freed from fat and colouring matters. The method by which the alkaloid cornutine is obtained is not described, the author apparently reserving to himself the fruits of his investigations. Ergotinic acid, even in excessive doses, did not produce very marked effects. Sphacelinic acid, however, appears to be a powerful poison, the amount obtained from 30 grams of ergot being sufficient to kill a fowl, and that from 200 grams to kill a small pig, death resulting from gangrene; it is therefore probably the cause of the fatality sometimes attending the use of rye bread containing ergot. On the uterus it acts strongly, causing tetanus of that organ. Cornutine is stated to be not the only alkaloid but the only energetic one that occurs in ergot. Dr. Roberts states that he has found the ergotinine of Tanret, prepared by himself, as well as that obtained from Tanret, to be without physiological effect, while the cornutine is extremely powerful, 0·5 of a milligram being sufficient to cause salivation, vomiting, diarrhœa and active movements of the uterus in warm-blooded animals, as well as contraction of the blood-vessels and an increase of blood pressure. The latter symptoms are also produced by sphacelinic acid. The author recommends that only preparations containing these two principles should be used.

"Terpine," said to be "produced by a chemical combination of turpentine, alcohol and nitric acid," has been brought before the Lyons Société des Sciences Médicale by M. Lepine aa a useful remedy in chronic or even subacute bronchitis, greatly facilitating expectoration, and in the same or smaller doses as a remedy in chronic nephritis. Its use is said to require circumspection (*Medical Times*, Nov. 29, p. 768.)

Teucrium Scordium, the water germander, is reported to have been used with advantage, both locally and internally, in the treatment of hæmorrhoids. Mr. Murjohn has prepared a liquid extract by exhausting the powdered herb with dilute alcohol, the preparation being of a blackish-green colour and given in doses of one or two fluid drachms (*Amer. Journ. Pharm.*, Dec., p. 616). A soft dark-green extract is obtained by evaporating this extract, which has been used in the form of pills, one grain being combined with two grains of the powdered herb. An ointment for local use is prepared by mixing one part of finely powdered herb with nine parts of vaseline.

The blue vervain (*Verbena hastata*) has been found by Mr. A. A. Weber to be an excellent sudorific (*Amer. Journ. Pharm.*, Dec., p. 616). The root, which has a bitter, astringent and nauseous taste, is the most active part of the plant, but the leaves and flowers may also be used. A fluid extract is made with dilute alcohol in the usual manner, the dose of which is one-half to one fluid drachm.

A new metal, to which the name of "idunium" has been given by its discoverer, Professor Websky (*Scientific American*, Dec. 6, p. 353), is reported to have been detected in vanadate of lead. It resembles vanadium in several respects, and the only oxide hitherto examined appears to possess distinctly acid properties and forms stable salts with bases. Its formula will probably be Id_2O_5, as its general characteristics and reactions correspond to those of vanadic acid.

Dr. Schweissinger has made some experiments (*Pharm. Post*, xvii., 1082) to determine the cause of the turbidity which is sometimes observed in solutions of sodium salicylate through the evolution of a multitude of small gas bubbles. He confirms the opinion of Dr. Hager that the gas given off is carbonic anhydride. Hs is of opinion, however, from examination of specimens of salt exhibiting this phenomenon, that the carbonic anhydride does not arise from decomposition of the salt, but has been absorbed by the salt from the atmosphere. In one case the quantity of absorbed carbonic anhydride was estimated to amount to 0·033 per cent. by weight of the salt. Dr. Schweissinger therefore points out the advisability of preserving sodium salicylate in well-closed vessels.

In estimating the quantity of essential oil yielded in the distillation of vegetable substances difficulty is frequently met with in consequence of the small quantity of the material, and the readiness with which it disappears during the operation. According to M. Levallois (*Comptes Rendus*, xcix, 977) an approximate titration may be made by means of bromine, which upon being added to water or alcohol holding essential oil in suspension is decolorized until a certain point is reached at which the yellow tinge remains permanent after stirring, and all the odour of the essential oil has disappeared. It is desirable for this purpose that the oil should be contained in a relatively small quantity of water or alcohol, which would in most cases necessitate redistillation; but M. Levallois points out that under suitable arrangements the whole of the essential oil is carried over with the first portion of the distillate. The oils experimented upon were those of orange flowers, orange peel, rose petals, anise, pelargonium, lavender, cumin, eucalyptus, and others, but nothing is said as to the quantity of bromine that each or all are capable of decolorizing. In the presence of water an additional indication that the limit of saturation is reached is given by the sudden appearance of a whitish resinous-looking insoluble matter that coats the sides of the containing vessel upon agitation.

In the evaporation of ether extracts, especially of fatty oils, it is frequently found difficult to get rid of the last traces of water derived from the ether. The drops of water adhering to the bottom of the dish cannot be driven off at a temperature of 100° C., whilst excess of this temperature is undesirable for fear of loss of oil by spirting. Herr Golwalovski proposes to overcome this difficulty (*Zeit. Anal. Chem.*, xxiii., 374) by using a dish, having the bottom pressed in so as to form a ridge from one side to the other. By a suitable tilting of such a dish the oil can be caused to run over on one side of this ridge, leaving the water uncovered and free to evaporate.

About two years since M. de Coninck described a new base obtained from the products of the action of caustic potash upon cinchonine, which proved to have the composition of a tetrahydroquinoleine ($C_9H_{11}N$), and to be isomeric with a compound resulting from the direct hydrogenation of quinoleine. He now announces (*Comptes Rendus*, xcix., 1077) that he has discovered the same compound in the decomposition products of brucine. It is therefore assumed that both cinchonine and brucine contain in their molecules a quinoleic tetrahydride group,

for although this compound has been as yet obtained only in minute quantity from either of them, this is looked upon as a residue which escapes the oxidizing action of the potash out of a larger quantity.

It is announced that the synthesis of saccharose has just been accomplished by Messrs. Aubert and Giraud (*L'Union Pharm.*, Dec., p. 552), and it is naturally anticipated that the discovery may eventually be of vast importance to the sugar industry. The process consisted essentially in submitting amylaceous matter derived from the potato, after it has been converted into glucose in the usual manner, to the action of an electric current equal to about 75 volts, furnished by a Meriten's machine. The electrodes, consisting of antimoniated lead plates, were immersed in the solution and the current reversed from time to time. The reaction terminated in about two hours and the finish was indicated by the liquid no longer giving the characteristic colour with tincture of iodine or a precipitate with alcohol. The liquid was afterwards defecated by means of lime, which was subsequently removed by carbonic anhydride, and the syrup was then decolorized and left to crystallize. The crystallized product upon analysis yielded 88·38 of saccharose, 1 per cent. of glucose, 3·67 per cent. of ash, and 6·95 per cent. of water; it was, therefore, far from being pure cane sugar. At present it has not been decided whether the reaction consists in the dehydration of glucose, the union of a molecule of dextrine with one of glucose, or the hydration of dextrine.

M. L. Brasse, in making some investigations as to the physiological function performed by amylase, has found that this principle is always present in the leaves of the plants which he has examined, viz., potato, dahlia, topinambour, maize, beet, tobacco and castor oil, as well as in the *Papaver somniferum*, red poppy and sunflower. The amylase is obtained by digesting the bruised leaves for twenty-four hours in cold water. The juice is then expressed, and one and a half times its volume of 90° to 93° alcohol is added, and the liquid filtered; after filtration the same quantity of alcohol is added and the liquid set aside to deposit. The precipitate is filtered off and washed with a small quantity of 65° alcohol. The amylase when present is contained in this precipitate, and its presence is proved by its action in converting starch into or reducing sugar and dextrine (*Comptes Rendus*, xcix., p. 878).

Herr A. Tschirch has found, during his researches on chlorophyll, that the want of permanency in colour of the solutions of that body is due in alcoholic extracts to the vegetable acids extracted along with the chlorophyll, which at once cause its transformation into chlorophyllan. The colour is best preserved in an alkaline extract, when chlorophyllan is not formed, but the chlorophyllinic acid unites with the alkali to form a more permanent green salt with a dark red fluorescence. The want of permanency of the green colour in dried leaves is attributed to the destruction of the protoplasmic envelope which served to protect it in the living plant.

In some cases bright yellow, red, or dull brown pigments are formed by the action of weak acids in the leaves on chlorophyll, or by the oxidation of the tannic acid contained in these leaves. In all cases of the development of autumnal tints it appears to be due to the triumph of chemical forces over the weakened or destroyed vitality of the living plant. These remarks do not, of course, apply to the bright tints seen on the young growing shoots of the cinnamon tree, the red and purple underside of the leaves of some cinchona plants or other coloration taking place during the active growth of the plant.

A correspondent has forwarded a singular monstrosity of the lemon fruit in which a small lemon is formed inside a larger one, and just below the stigmatic end, nothing in the external appearance of the lemon indicating the presence of a smaller one inside. The smaller one has also a perfect rind. Dr. M. T. Masters, to whom the specimen has been submitted, states that although this mode of growth is of frequent occurrence in oranges, he has not before seen it in a lemon. In his opinion it is formed by the thalamus, having produced one whorl of carpels, again starting into growth and producing a second whorl. In his 'Teratology,' p. 134, is a description of a similar growth arising from the multiplication of carpellary whorls which subsequently become separated by the growth of the axis. In this case, however, the inner lemon has a rind, which is regarded by Dr. Masters as a development from the axis independent of the carpels and ultimately covering them over.

M. J. Velenovsky, in a lengthy paper of fifty-six pages (*Bull. de la Soc. Tcheque des Sciences*, [6], xii., 1884), has drawn attention to the characters of the nectariferous glands in the Cruciferæ, which he believes might be employed in characterizing some genera and even larger groups. Thus the absence of the superior nectaries may be said to characterize the *Alyssineæ*, *Lunariæ* and *Cheiranthæ*. The form of the nectaries may also serve as a diagnostic character of some genera. The author gives a table of the classification of the Cruciferæ with the application of the new characters. Any method, by which the section to which a cruciferous plant belongs may be determined without having to wait until the structure of the seed can be examined, may be considered a boon to systematic botanists, and this method may be regarded as a step in that direction.

M. L. Crié has made known (*Comptes Rendus*, cxix., p. 943) the result of his study during several years of the flowers of the common *Lychnis dioica*, L. (*L. vespertina*, Sibthorp). These flowers are generally considered by botanists to be pentamerous. He finds, however, that the plant possesses both pentamerous and tetramerous flowers. He finds also that the limb of the petal is quadrifid instead of bifid, as generally described, all stages from a mere groove to a deep incision being found to occur. While the calyx of the male flower has only ten nerves, that of the female calyx has sixteen or twenty nerves, according to its pentamerous or tetramerous character. He finds, moreover, that the flowers are trimorphic; the male flowers having stamens of three different lengths in different plants, and the female flowers having styles differing in length in the same manner. The internode between the calyx and the corolla in the male flower is absent in the female.

In the *Gardeners' Chronicle* (Dec. 4, p. 757), Mr. A. Stephen Wilson figures the sclerotia of the potato fungus, *Phytophthora infestans*, which are encrusted with a coating of oxalate of lime. Some doubt had previously been thrown on the character of these bodies by other observers, owing apparently to their not having been carefully separated from the tissue in which they were embedded previous to

examination, and to the fact that they were found in living tissue, in which alone, however, according to Mr. Wilson, they are capable of germinating. Mr. Wilson's observations have been confirmed by Mr. Worthington Smith, who had previously observed a myxomycetic fungus coated in the same way with oxalate of lime. These observations suggest the necessity in microscopical investigations of using solvents to remove mineral matter when examining vegetable structures.

Messrs. T. Christy and Co. have recently forwarded a specimen of the flower of the "alvelos," the plant which has lately been introduced as a remedy for cancer and allied diseases. The plant was cultivated in a greenhouse at Sydenham, and produced only a few flowers, most of which, however, dropped off before arriving at maturity. The stem of the plant is fleshy, smooth, and cylindrical, about one-third of an inch in diameter; the leaves are smooth, pale green, lanceolate oblong with a cordate base, sessile and alternate. The flowers are small and green, and the involucre has four wedge-shaped lobes. The flowers have been submitted to Boissier, one of the best European authorities on the genus *Euphorbia*, and so far as can be gathered from the imperfect state of the flowers, he has decided that it belongs to the genus *Euphorbia*, and to a species not described in Martius's 'Flora Brasiliensis,' but almost certainly belonging to the section *Dichilium* and nearly allied to *E. anomala*, Salzm. (*E. insulana*, Velloso).

An interesting paper in the *American Journal of Pharmacy* (Dec., p. 641) goes to prove that *Martynia proboscidea*, a plant which is best known by its very peculiar fruit, and belonging to the same order as the plant which yields gingelly oil, namely, Pedaliaceæ, is fertilized by insects, chiefly of the genus *Melissodes* and *Halictus*, and that it is possibly insectivorous, inasmuch as in the upper surface of a leaf taken from the middle of the stem as many as sixteen hemipterous and one coleopterous insects and on the lower surface one hundred and twelve dipterous and five coleopterous insects were found, caught by the sticky glands which cover the surface of the leaves.

M. Maumené, in the course of a long series of experiments made on the existence of manganese in plants, has found that it is present in wheat, rye, rice, barley, potatoes, beet, carrot, cocoa, and especially in coffee, tea and tobacco; tea containing the largest proportion. He finds that it is not always present in the blood, that there is very little in milk and but little in the urine, bones and hair, but a considerable quantity in fecal matters (*Rép. de Pharm.*, Dec., p. 554).

A new variety of hop has recently been exhibited by Professor Max Cornu at the National and Central Horticultural Society of France, in which the lower leaves do not fall off as in the common hop. It is of very rapid growth, forming tufts upwards of 23 feet in height in one year. It is of Japanese origin, and was raised from seeds by M. Breitschneider (*Gard. Chron.*, Dec. 6, p. 721).

In the *Journal de Pharmacie* (November, p. 428) Professor G. Planchon points out the microscopical distinctions between the ordinary cuprea bark (*Remijia pedunculata*) and the cinchonamine bark (*R. Purdieana.*) The chief difference is in the presence, in the parenchymatous zone of the bark, of a number of stony cells, which are crowded in numerous and well-developed radial lines, which end abruptly. In *R. Purdieana* these cells are very few and distant, and all the cells have thinner walls. The presence of the stony cells in the latter cannot be seen with an ordinary lens, although readily visible in *R. pedunculata.*

The mode in which the large deposits of resin found in the earth in Borneo are formed has been investigated by Mr. Posewitz. He finds that it is the product of various trees belonging to the Burseraceæ, Coniferæ, and Dipterocarpeæ, the resin of which falls from the branches in large lumps and then becomes mixed with mud and is washed away by heavy rains to the neighbourhood of the sea.

A case of poisoning by the berries of the black bryony (*Tamus communis*) which lately happened in France (*Répertoire*, Nov., p. 519) has served to direct attention to the poisonous character of the tempting scarlet berries of this plant. The symptoms produced in a child twenty-seven months old were colic and vomiting. The physiological action of the plant being but little known, M. H. Coutagne tried the effect of an alcoholic tincture of the berries on frogs and guinea pigs, in which it speedily produced paralysis and convulsions. Seventeen of the berries given to a dog caused uncertainty of gait and a partial paralysis of the hind quarters lasting several days. The seeds of the black bryony are hard and spherical, whilst those of the white bryony are oval and flattened.

The *Scientific American* (Dec. 6, p. 353) gives some interesting details concerning the trade between Japan and the United States. Several articles of pharmaceutical interest, but by no means used exclusively for pharmaceutical purposes, figure in the returns. Of crude Japanese camphor as much as 33,241 piculs (of 133⅓ lbs.) were imported into the United States last year; of Japanese vegetable wax, used in the manufacture of cartridges and celluloid, 2600 piculs; of cuttlefish-bone, used for canaries, etc., 1600 piculs; of Japanese fish oil, 100,000 piculs; and of isinglass, apparently of the kind derived from fish, and not from seaweed, 9000 piculs. Antimony and white powdered mica are other articles imported from Japan.

The discussion on the comma bacillus has reached a further stage. Dr. Koch replies to his assailants that he is aware that a bacillus, resembling that of the cholera bacillus, is present in the saliva, but says that it differs in character when cultivated and will then be seen to be quite distinct, as it will not grow in the neutralized cultivating gelatine, in which the cholera bacillus grows rapidly. He has also found that by injecting one-hundredth of a drop of the cultivations of the comma bacilli into the small intestine of dogs and guinea pigs, the animals have, as a rule, died in one and a half to three days, and the *post-mortem* appearances of the intestine were the same as in acute cases of cholera, the fluid in the intestine also containing swarms of the comma bacillus (*Nature*, Dec. 4, p. 98).

M. G. Pouchet has recently stated (*Comptes Rendus*, xcix., p. 848) that the dejections of patients suffering from cholera have always an alkaline reaction, and that when exhausted by chloroform they yield an oily liquid, easily oxidizable, which possesses extremely poisonous properties. This he states is certainly a ptomaine. A subcutaneous injection containing only a trace of this body killed a frog very rapidly, by a considerable slowing of the

action of the heart taking place and intense rigidity after death was observed.

Messrs. Nicato and Reitsch mention that pure cultivations of the comma bacillus have a characteristic odour, neither putrid nor disagreeable, but somewhat ethereal, and that this odour is that of the intestinal dejections at the commencement of the disease, particularly if they be exposed during twenty-four hours in a moist atmosphere at a temperature of 25° to 35° C. They find also that if cultivations of the comma bacillus of eight days old at least, made either in soup (*bouillon*) or in Koch's gelatine medium, and filtered through a Pasteur's filter so as to separate the bacilli, are injected into the larger circulatory veins, such as the jugular or crural vein, in dogs, symptoms closely resembling those of cholera are produced, although the same liquids injected under the skin even in large quantity did not produce any result, but that recent cultivations, whether injected into the veins or under the skin, have been found perfectly inactive (*Comptes Rendus*, xcix, p. 928). These experiments seem to indicate that the cholera poison is a product developed by the action of the comma bacillus rather than the bacillus itself.

AMYL NITRIS.*

Nitrite of Amyl.

BY DR. SQUIBB.

(*Concluded from p.* 486.)

On comparing the sixteen fractions of No. 3 all were of a full yellow colour throughout, though slightly paler than No. 2, and the difference in shade between the first and last fractions was slightly greater than in No. 2. The first three fractions came over opalescent, and on standing minute drops of water collected upon the sides of the vial, leaving the liquid transparent. There was no discoverable difference in effect between the fractions of No. 3 and No. 2, until about the eighth fraction was reached, but from about this point there was an increasing difference to the end, and the last three distillates and the residue from the retort were all more feeble in effect, and gave rise to cough, from a larger proportion of amylic alcohol. From these considerations it seems probable that No. 3 was nearly equal to No. 2, the chief difference being that it had a larger proportion of amylic alcohol, and nitrate of amyl, and a smaller proportion of aldehyde, and contained a little water; and these would fully account for its slightly weaker physiological effect.

Specimen No. 1 was very different from the others. It was distilled in thirteen fractions, the residue in the retort making fourteen. The colour of the original liquid was pale yellow, much lighter than the other specimens, and the first fractions were of a considerably deeper colour, diminishing in colour so that the original paleness of colour was not reached until about the seventh fraction. From this point the colour diminished more rapidly to the tenth fraction, when the distillate became practically colourless; but the fourteenth fraction, or residue, from the retort was of a deep reddish-yellow or orange-yellow colour, different both in kind and in degree from any of the fractions of any of the specimens. The first four fractions came over very opalescent, and from the first of them about one-sixth of its volume of water separated out. From this the proportion of water diminished to the fourth, and disappeared from the fifth fraction.

The difference in odour and effect on the head was quite as marked as in the colour. The first three or four fractions were moderately prompt, but feeble in effect as compared with Nos. 2 and 3, and after the fourth the effect was very feeble, exciting cough after the seventh in an increasing degree.

From these circumstances it would appear that No. 1 is of very inferior quality, and quite unfit for medicinal use, and yet it is probably sold as nitrite of amyl in larger quantity than both the others together.

When each specimen was mixed with an equal volume of officinal solution of potassa, the solution in five minutes was of a full yellow colour in Nos. 1 and 3, and of a deep brown colour in No. 2, and on standing 48 hours the No. 2 gave a light precipitate, probably of aldehyde resin. No 2, therefore, contains the largest proportion of aldehyde, the others containing very little.

Each specimen warmed with excess of solution of potassa and then treated with a few drops of test solution of iodide of potassium, and with acetic acid to acid reaction, gave a blue colour with starch paste, and would do so if only the very smallest proportion of nitrite was present. This test does not detect the presence of nitrite of amyl at all, but merely tells whether the liquid contains any nitrite or not. If the liquid was wholly nitrate,—that is, free from any trace of nitrite, the testing would be negative,—no blue colour would be produced. It would be an excellent test for the presence of nitrite of amyl in the nitrate, but is quite useless for testing the nitrite. The nitrate is much more difficult to make than the nitrite, and it is very difficult indeed to get it so free from nitrite as to stand this test. Hence there is no danger of its being substituted for the nitrite in so pure a condition as to stand this test. But if so substituted it would be recognized at once from its being colourless,—from having a very different odour, and no effect upon the head. What is really needed here is a test for small proportions of nitrate when accidentally contaminating the nitrite, and the writer knows, of no such test that is better than the boiling point, and yet a specimen may actively boil at 96° C. or below it, and yet have a considerable proportion of nitrate accidently present. And a specimen containing a considerable proportion of nitrate may distil completely long before the temperature reaches the high boiling point of the nitrate.

Nos. 1 and 3 did not stand the excellent test for absence of water, as both were opalescent in ice-water, though No. 3 was but slightly opalescent, as is permitted by the Pharmacopœia.

The limit of free acid was not passed by either specimen, but the test for free acid is not easy to apply properly, because the nitrite when quite neutral becomes rapidly acid on exposure to the air. The solution of ammonia should be put into the tube first, and a small piece of litmus paper dropped into it. Then the nitrite is added and the mixture well shaken. The litmus should then remain blue. But on standing a little while it will become red, and require a few more drops of the dilute ammonia to restore the blue colour, and this may be repeated time after time. And if while the litmus remains blue, another piece wetted with water be held in the air of the tube over the liquid it will be promptly reddened by the vapour.

It has been mentioned that good glass-stoppered vials of one ounce capacity, the stoppers being ground in with extraordinary care, and the ground surfaces being slightly lubricated by a very minute quantity of soft white paraffin,—are the best containers for this very difficult liquid; but there is another way of transporting and dispensing it that is well worthy of attention. It is not uncommonly put up and sold in the form of "Pearls of Nitrite of Amyl." These pearls are minute flattened flasks, with rather long necks, the end being sealed in the lamp after the little flasks are filled. They are of various sizes containing either 2, 3, 5, 8, or 10 drops of the nitrite. Formerly they were made of very thin glass, so as to be crushed by the fingers when held in

* From *Ephemeris*, November, 1884.

the folds of a handkerchief. But when so thin as this a large proportion of them were lost by spontaneously bursting. This naturally created great dissatisfaction to buyers and a strong prejudice against them. Now, however, they are made of much thicker glass and cannot be broken by the fingers, and the spontaneous bursting is now comparatively rare. But they now require some hard substance to break them. Enclosed in the folds of a handkerchief, and laid upon a table, a smart blow with a closed pocket knife is sufficient to break the glass and liberate the contents for use. They are sold by the dozen, or by the hundred as ordered, packed in cotton, in pasteboard boxes. One house sells them in boxes of one dozen each, and each box contains what is called a crusher. This consists of two small turned wooden boxes, one inside the other. The inner box holds two or three pearls, and between the bottom of the inside box and the bottom of the outside one, is carried another pearl surrounded with a little cotton. This crusher is intended to be carried about the person, and when the effect of the nitrite is needed the lid of the outside box is taken off, and the inside box is forced down upon the pearl beneath it so as to crush it and allow the liquid to be absorbed by the cotton. The inner box is then taken out and the vapour inhaled from the outer box. This is much better than inhaling it from a handkerchief, because the diffusion is so rapid from the latter that it is difficult to get the vapour into the lungs in a sufficiently concentrated state, or to get enough of it before it is dissipated. Inhaled from the tuft of cotton in the box it is about as good as if inhaled from a bottle, the vapour being quite concentrated and in sufficient quantity for any ordinary use from a 3 drop pearl. If to be inhaled from a handkerchief a 5 or an 8 drop pearl is better. The chief objection to these pearls is that there is no security for the quality of the contents except the maker's label on the box, and the maker of the pearls has to rely for his security on the maker of the liquid. Then the liquid, by the necessary exposure in measuring off and filling each pearl, doubtless is somewhat damaged, and by ignorant or careless management might be very much damaged. These pearls are now dispensed originally by two houses in New York, from whom most if not all the dealers get them, and from an examination of the pearls from the two sources they apper to be identical, so that it is probable that one expert fills them for both firms. The contents of the pearls from both firms were examined and found to be identical as far as could be ascertained, and the nitrite was of good quality,—much better than specimen No. 1, and quite as good as No. 3, though it appeared to be not quite as good as No. 2, which latter however it strongly resembled when submitted to the same tests. There is every probability that the pearls were filled from No. 2, but that the quality had slightly fallen off in the necessary exposure in filling; but the amount of falling off was practically unimportant.

Another secondary objection to the pearls is their comparatively high cost. The expense of the glass and of the expert skill required in filling and sealing, and the accidental losses by bursting and by small cracks in the glass, are necessarily great,—probably far greater than the cost of the liquid, so that it takes comparatively few of the pearls to be equal in cost to an ounce vial of the liquid. Nevertheless, they are very convenient in use, and nicely applicable to some cases, where the expense is hardly an objection so long as the quality of the contents can be assured.

By far the most economical, and perhaps the best way of using it, is to buy it in ounce vials, and from such a vial to replenish, as often as may be needed, a very small pocket vial, stopped with a good cork, that is occasionally renewed. The pocket vial should be small and strong to avoid breakage in the pocket,—say a 30 minim vial with as large a mouth as possible, and this should be about half filled. The vapour should always be inhaled from the vial,—at least there are very few cases in which a sufficient effect cannot be obtained by smelling at the mouth of the vial with one nostril, the other being closed, and the wider the mouth of the vial the more vapour is obtained in this way. The few cases that cannot get enough vapour directly from the vial may carry a piece of glass tubing corked at both ends, and containing a little tuft of cotton upon which about 2 or 3 minims of the nitrite is dropped. When both corks are removed and the air gently drawn through the tube by the nostril, a very concentrated vapour is easily and quickly obtained. Two inspirations from the mouth of a 30 minim vial is sufficient to flush the writer's face and increase the pulse rate by forty beats, and the effects pass off within a minute and a half, excepting the pulse rate, which diminishes less rapidly. A third inspiration, ten or fifteen seconds after the two, very considerably increases the effect of the others, both in degree and duration, and gives about all the effect that is needed in a large proportion of cases. Twenty such administrations does not appreciably diminish the quantity of liquid in the vial, but does affect the quality somewhat, so that from time to time, as the effect is observed to become weaker, it is better to throw away the residue in the pocket vial and re-supply it from the stock in the ounce vial. This latter vial should always be kept in a cool, dark place, as directed by the Pharmacopœia.

Nitrite of amyl is almost exclusively used by inhalation, and for prompt and temporary effect in emergency, and hence the great importance of its being of good quality and in readiness for instantaneous application. Its prominent effect is to suddenly and temporarily relax or paralyse the muscular coats of the arteries, thus suddenly dilating these vessels. This practically diminishes the resistance against which the heart, as a force-pump, has to act, without diminishing the power which, for the time, is applied to the heart. Thus relieved of resistance while the power is continued, the heart beats faster in proportion to the relief, until at a latter stage, when, if the nitrite be continued, the power applied to the heart becomes lessened and its rate diminished to the new conditions. In a large proportion of the uses of the nitrite this second stage is to be avoided as useless, if not hurtful, so that when the desired results are not obtained from the full effect suddenly produced by a few inhalations, it is best to withdraw the agent entirely for a short time, and then repeat with an increased dose if desirable.

When the administration is of short duration it is not easy to overdose it, because the effects pass off so very rapidly; and most of the harm which has been done by it seems to have been by continuous administration. so as to intensify the after stage of the general depression. The writer once accidentally broke a flask by which about 2 pints ran over the table and floor of a small room, and as it was necessary to get at some gas burners and put them out before the vapours took fire, he was exposed for many seconds to a very concentrated vapour. The effect was exceedingly sudden and great. Not only the head but the whole body seemed to swell as though it would burst, and although consciousness was not disturbed, and the necessity for getting out of the room all the time fully recognized, yet the power to walk seemed very nearly lost as the door was passed and a seat outside was reached, yet the effect passed off in a very few minutes, leaving merely a headache.

It thus appears that nitrite of amyl is simply a powerful temporary disturber of the heart and arteries, and through the perturbation caused by it a sudden supply of blood may be taken from the venous system and thrown into the arteries. It is easy to understand how so profound a disturbance, so suddenly induced, may interrupt and reverse any abnormal condition which is commencing, in which contraction of the capillary arteries has either a primary or secondary agency. For example, if the epileptic seizure begins by a local anæmia in the nervous

centres, it is easy to understand how nitrite of amyl may interrupt and reverse this, and thus prevent the seizure whenever the effect can be induced in time, and thus the statement to the writer of the superintendent of one of the largest hospitals for the insane in the world can be easily understood. The statement was, in effect, that since his nurses and attendants had been trained to the proper use of nitrite of amyl, his epileptic wards had been revolutionized for the better; and further, that by continued prevention of the seizures the habit of recurrence was broken, so that in many cases a curative effect was obtained from an agent not at all curative in itself, and of mere momentary action.

From the same considerations it is easy to understand how the cold stage of paroxysmal fevers may be interrupted and aborted by the nitrite, while the cold stage of collapse is not benefited, but injured by it. So in the heart-stasis of one of the fatal forms of chloroform poisoning, if the nitrite can be applied before the cardiac syncope is complete, the diminution of the resistance to the heart's action may, in its feeble condition, enable it to make the few pulsations needed to restore the centres of inervation and thus prevent death.

Almost all the cases of pure spasmodic asthma which occur suddenly, and a large proportion of the cases of angina pectoris are relieved by nitrite of amyl by a similar rationale, and the amelioration of spasm in tetanus has a similar explanation. There appears to be some relation between the suddenness of the attacks and the usefulness of the remedy, since in the records of its application it is rarely of use in conditions which come on slowly, or, it may relieve for the moment only. Thus only a few neuralgias, and those of the spasmodic kind, appear to be relieved by it for any considerable length of time.

It has occasionally been given by the stomach and by hypodermic injection in doses of three or four minims at a time. But when taken into the stomach it would have a different effect, and be applicable to a different class of uses. Hypodermically given it has proved effective when respiration was either wholly or partially suspended, so that its effects could not be reached by inhalation.

THE COLLECTION OF BRAZILIAN DRUGS AT THE VIENNA EXHIBITION.

(*Concluded from page* 329.)

Raiz de Japecanga (*Smilax Japecanga*, Griseb.).—The root is used instead of sarsaparilla in Rio Janeiro, and by many physicians is esteemed superior to it.

Raiz de Manacan or Mercurio vegetal (*Brunsfelsia Hopeana*, Benth.).—On account of its energetic action on the lymphatic system it has become a popular remedy in all syphilitic affections, and hence its name of vegetable quicksilver. In large doses it is powerfully purgative, and may produce abortion. In some medical works the use of the leaves is recommended, but they are not used in Rio Janeiro.

Raiz de Pariparoba (*Potomorphe umbellatum*, Miq.).—The fresh leaves are used in hæmoptysis and hæmatemesis; a glass of the expressed juice is mixed with the yolk of an egg and a spoonful of sugar, and taken morning and evening. The infusion of the root is taken for obstructions of the bowels, liver complaints, and rheumatism.

Raiz Quitoco (*Pluchea Quitoco*, DC.).—The infusion of the root is used in hysterical affections and as a diuretic, a tablespoonful being taken every hour. The infusion is made from 8 grams of the root to 240 grams of water.

Raiz de Sapé (*Anatherum bicorne*, Beauv.).—The root is employed by the local physicians as a substitute for *Radix graminis*, as a diuretic and diaphoretic; it is commonly used as a cooling drink in yellow fever.

Raiz de Tabibuia (*Tecoma tabibuia*).—The root is used as a substitute for cork.

Raiz de Tayuya (*Trianosperma Tayuya*, Mart.),—The root has of late years been exported to Italy and France, as a remedy for syphilis, but has been officinal for a long time at Rio Janeiro.

Ipé tabaco (*Tecoma Ipé*, Mart.).—The rasped wood is illegally substituted in some shops for *Lignum guaiacum*. See Peckolt, *Zeit. allg. öst. Apoth.-Ver.*, 31, 1873.

Carica papaya, alcoholic extract of.—This is prepared by evaporating the expressed juice of the leaves to one-half and then adding absolute alcohol, the crude papayotin thus precipitated being also used in medicine under the name of extractum papayotinum. From this the pure papayotin is obtained by redissolving it in water and treating it with acetate of lead. The spirituous extract is prepared by distilling and evaporating the first alcoholic solution after the precipitation of the papayotin. Its therapeutical properties require investigation. The crude papayotin prepared from the leaves is prescribed in the form of pills, in doses of 0·05 to 0·15 gram. True papayotin should be easily soluble in cold water.

Papayotin e Jacarathia.—The fruit of *Carica dodecaphylla* affords less juice, not being larger than a pear; the milk, however, affords about 15 per cent. of papayotin, and is much sought after as a remedy for the opilacao. (See *Doliarin*). It is also, like papayotin, used as a cure for tape worm.

Paú d'Alho (*Gallezia Gorazema*, Moq.). — The alcoholic extract possesses the peculiar penetrating odour characteristic of the whole plant, and which is intermediate in character between that of the radish and garlic. The infusion of the leaves is employed in hysterical affections; the leaves are used in baths for rheumatism, and as a poultice for tumours and buboes. The spirituous extract is given in doses 0·025 to 0·05 gram for hysteria. The leaves and wood are being examined chemically by Dr. Peckolt, who is of opinion that the therapeutical properties are also worthy of investigation. The plant belongs to the *Phytolaccaceæ*, a family containing several plants possessed of powerful medicinal properties.

Starch of Caratinga Femea (*Dioscorea piperifolia β triangularis*, Willd).—In the wild state the oval tubers often weigh 500 to 800 grams, but in the cultivated state are often much larger. Dr. Peckolt found the root to yield 29 per cent. of starch, and Dr. A. Busse, of Jena, obtained from it 3·192 per cent. of gluten.

Starch of Cara Guiné (*Dioscorea aculeata*?).—This species of yam yields a very large root. It was brought from Africa to Bahia by the negroes, and in Rio is called Inhame da Costa. Dr. Peckolt found in the fresh root 20·5 per cent. of starch and 2·09 per cent. of nitrogenous matter.

Starch of Chuchú (*Sechium edule*, Sw.). — The plant is largely cultivated as a vegetable. The fruit weighs sometimes as much as 3 to 4 kilograms. It yields 17·5 of starch.

Starch of Batata de Jararaca (*Dracontium Wallichii*, C. Koch).—The plant derives its name from having exactly the appearance of the Jararaca snake. The dried and pounded root is used as a popular remedy against asthma and amenorrhœa, and is sold by a friar, in the form of a powder, as a remedy for snake-bites. The dose is one gram, which should be taken in brandy. Two doses are supposed to effect a cure. The starch is used to make a soothing drink for whooping cough. The fresh roots contain 5 to 8 per cent. of starch.

Starch of Pinhoes (*Araucaria brasiliana*, M.).—The fruit contains 28·5 per cent. of starch according to Peckolt (*Arch. der Pharm.*, Bd. 122, p. 219, 1865).

Starch of Mandiocca do Mato (*Manihot Pohlii*, Wawra).—The woody root of the wild plant yielded, under cultivation, at the hands of Dr. Peckolt, an edible root containing 1·18 per cent. of starch in the cortical portion, and 6·24 per cent. of a starch-like substance in the meditullium

Starch of Banana Seed (*Musa rosea*).—The seeds of banana are black and of the size of peas. They yield 31 per cent. of starch.

Starch of Tea Seed (*Thea sinsensis*, Sims).—The tea-plant was formerly cultivated under Government supervision at New Freiburg, and the plants flourished well, but in two years the cultivation was given up owing to the unfitness of the Chinese to fulfil their contract, and the plant now grows wild. Dr. Peckolt obtained from the seeds 13·847 per cent. of starch, 1·058 caffeine, 7·5 per cent. of a fat, a bland oil, etc.

Starch of Abacate (*Persea gratissima*, Gaertn).—The fresh kernels, which are used as a tonic, are also reputed to have aphrodisiac properties. They yield 8·5 per cent. of starch, which is used for diarrhœa.

Starch of Guaranhem.—The starch is used to apply to the navels of newly born children.

Oil of Oito-cica de Céará (*Soaresia nitida*, F. Allem).—In Céará an oil is obtained by boiling the fruit, and is sold as a liniment for rheumatism.

Oil of Pati-puta (*Ouratea parviflora*, Baill.).—In the northern provinces of Brazil an oil is obtained from the seeds by boiling them in water, and is also sold as a remedy for rheumatism.

Oil of Coqueiro leque (*Livistona chinensis*).—An oil is obtained from the pericarp and used for various purposes. A gum known as Resina de Coqueira Leque is also obtained from this palm.

Gum of Angico Vermelho (*Piptadenia rigida*, Benth.).—The gum is officinal, and is kept in all the pharmacies at Rio; the mucilage is used in catarrhal affections and a syrup is made with it, known as angico syrup. The name angico is also applied to the gum of *Acacia Angico*, Mart., the mucilage of which is also used in the form of syrup for bronchitis.

Resina de Monjolo (*Enterolobium Monjolo*, Mart.).—The gum of this plant is used for the same purposes as the last.

Gummi de Brincos or Lagrymas (*Vochysia gummifera*, Mart.).—This is used by the Indians as an ornament, but by the people as a remedy for diarrhœa.

Gum Cajú.—The gum of *Spondias macrocarpa*, Engl., is used as a substitute for tragacanth under the name of Gummi Cajú.* This name is also applied to the gum of *Anacardium occidentale*, L., which is exported from the northern provinces of Brazil to France in considerable quantity. The fruit of the latter plant also yields 0·84 per cent. of a resin, which is known as Resina fructo de Cajú.

Gum of Paineira Macho (*Chorisia Peckoltiana*, Mart.).—A bassorin gum exudes in large quantity from this tree in the months of May and June, when the tree is leafless and shortly before it blossoms; it is used by hatters. Dr. Peckolt found 100 grams of the gum dried in the air to consist of 70·885 p.c. of bassorin, 22·611 p.c. of moisture, a tannin giving a green colour with ferric salts, 1·041 p.c.; a dark yellow fatty oil, 0·210 p.c.; a dark red resin, 0·609 p.c.; ash, 4·643 p.c., containing 20 p.c. of carbonate of calcium. Internally, the gum is given in the fresh state for dysentery, and is used externally as an application to prolapsus ani.

Gummi Sicopira (*Bowdichia major*, Mart.).—The gum† of this tree consists, according to Dr. Peckolt's analysis, of arabin, 30 per cent.; bassorin, 44 per cent.; resin, 3·86 per cent. An alcoholic extract of the bark is used in the form of pills in herpetic affections, in doses of 0·1 to 0·2 gram.

Resina de Aroeira (*Schinus molle*, L.).—The powdered resin is used as a local application for prolapsus ani.

Resina da Flor de Pinheiro (*Araucaria brasiliana*, M.).—The resin which exudes from the male flowers is used in the preparation of a syrup for coughs.

Resina de Cipo Alcemega (*Styrax alcemeya*, Peckolt?).—The resin of this rather rare climbing plant is much prized by the country people as a remedy for wounds. The resin, which the plant yields abundantly, has a pleasant odour. An alcoholic extract of the bark is substituted for the natural resin when it is scarce.

Alcemega do Mato Virgem (*Protium Icicariba*, Mart.).—The resin resembles elemi in odour and has a greenish tint when fresh. It is much prized by the people, and therefore seldom comes into commerce.

Alcemega Branca (*Icica heptaphylla*, var. *Brasiliensis*, Engl.).—This is the Brazilian elemi of commerce, and is used in the apothecaries' shops in Rio Janeiro.

Resina de Imbir Assú (*Bombax Carolinum*, Vell.).—The bassorin gum of this tree is used in the arts under the name of Resina de Imbir Assú, and an alcoholic extract of the seeds is used in gonorrhœa under the name of Resina Seminum Imbir Assú.

Resina d'Araticum do Mato (*Rollinia salicifolia*, Schl.).—The gum is of a bassorin character and contains tannin. In the fresh, still sticky state it is used as an application to ripen boils.

Resina de Larangeira (*Citrus Aurantium*, Risso.).—A gum which exudes in quantity from this tree when it begins to decay, probably in consequence of the attack of insects, is used as a remedy for coughs. A similar gum from the peach tree (*Resina de pecegueira*) is used in like manner.

Resina de Carvalho Amarello (*Rhopala Pohlii*, Meiss.).—This gum is easily obtainable in quantity in the forests, but is not yet used, although the timber of the tree is much valued for building purposes.

Resina de Jetahy (*Hymenæa stilbocarpa*, Mart.).—The natural resin, which is a Brazilian copal, is officinal, and is used as a medicine, and the syrup of jetahy or jatubá as a pectoral; a spirituous extract of the bark is used for the same purpose. The residue of the resin left after the preparation of the syrup is used in making varnish.

Resina de Oleo Vermelho (*Myroxylon peruiferum*, Linn. f.).—The fragrant natural resin of the bark popularly known as "Balsam milagroso" is collected with great care by the Indians and woodcutters, and is sold at a high price. It is considered as a universal remedy for all diseases. See *Pharm. Journ.*, [3], vol. xi., p. 818.

Resina de Unha de Gato (*Acacia paniculata*, Willd.).—A good substitute for gum arabic.

Resina do Cravo de defunto do mato (*Tagetes glandulifera*, Schirk.).—The resin is used as an anthelminthic in doses of 0·1 gram.

Resina de Allamanda (*Allamanda Schottii*, Pohl.).—An alcoholic extract of the root is used as a substitute for scammony in doses of 0·1 to 0·2 gram.

Resina de Coco de Pindoba (*Orbignea Eichleri*, DC.).—This cocoa nut contains 2·9 p.c. of an acid resin, 4 p.c. of a crimson colouring matter, 3·9 p.c. of a tannin giving a dark green precipitate with ferric salts, and 37·5 p.c. of fat. The bruised seeds are used as a plaster for rupture.

Resina cort. Paù Pereira.—The resin remaining after the preparation of the geissospermine from the alcoholic extract is mildly purgative.

Resina Jaracathia (*Carica dodecaphylla*, Vell.).—The resina extracted from the bark by alcohol is used in the form of pills as a purgative.

Resina de Caracalla or Teia de Aranha (*Euphorbia Tirucalli*, L.).—The resin is obtained by treating the dried milk of the plant with boiling absolute alcohol, when on cooling an apparently crystalline resin separates; after this has been removed the alcoholic solution on evaporation yields the resin. The resin, as well as the juice, is poisonous and acrid.

Agoniadin, $C_{10}H_{14}O_{12}$.—This intensely bitter glucoside is prepared from *Plumieria lancifolia*, Mull. See *Zeit. œst. Apoth.-Verein*, 1869.

Doliarin (*Urostigma doliarium*, Miq.).—The active principle of the juice of the gamelleira is already officinal as a remedy for the peculiar form of chlorosis caused by the *Anchylostoma duodenale*, and locally known as opilacao. It kills the parasite. The dose is 0·1 to 0·2 gram. According to Vortmann's analysis its formula is $C_{23}H_{30}O_2$.

* See *Arch. der Pharm.*, vol. cx., p. 44, 1862.
† See *Arch. der Pharm.*, vol. cix., p. 37, 1862.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 27, 1884.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE,, *Secretary*, 17, *Bloomsbury Square, W.C.*

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A CONTRIBUTION TO THE HISTORY OF DISINFECTANTS.

IT is hardly surprising that the cloud of assertions and contradictions which has recently enveloped the germ theory of disease should have been favourable to the development of doubt as to how far the theory itself has any foundation in facts outside the fancies of enthusiastic physiologists. Nevertheless, although many of the statements and theories that are being continually put forward may prove to be premature or unfounded, and although each fresh investigation seems to extend rather than limit the field to be explored, it must be admitted that work is being done and observations are being recorded in this country and on the continent which are rich in promise of the eventual elucidation of much that is now mysterious respecting the life history of the zymotic diseases that are at present so serious a scourge to the human race. Hasty assumptions and incorrect inferences may retard progress or even bring discredit upon the study ; but each year adds to the store of known facts waiting for a proper explanation of their bearing, and the world is so much the richer. One more valuable contribution to previous knowledge of the subject has just been published in the Report of the Medical Officer of the Local Government Board for 1883. In these columns it would not be advisable to refer to all the topics dealt with by Dr. BUCHANAN and his colleagues in this Report and its Appendices ; in the present notice, therefore, we shall confine ourselves to some portions that are closely connected with the subject of antiseptics and disinfectants.

When referring to the last previous report the observation was mentioned that during the septic fermentation proteids are sometimes broken up so as to form compounds of the "aromatic" group which are capable of exercising a strong antiseptic action and may finally arrest the fermentation through which they originated. Thus the splitting up a proteid substance in one direction gives rise to the formation of tyrosin, hydroparacoumaric acid, paroxyphenylacetic acid, paracresol, paroxybenzoic acid and carbolic acid in what may be regarded as successive steps in the septic process. In other cases the formation has been recognized of acids in which one atom of hydrogen of a fatty acid radical is replaced by phenyl (C_6H_5), as for instance, phenylpropionic acid and phenylacetic acid. It has also been ascertained that both these acids are powerful antiseptics, far more effective than carbolic acid in rendering a liquid unfit for the growth of bacteria and of annulling the vitality of septic organisms when allowed to act upon them for a given time. In the present report the history of the subject is carried a little further and an account is given of the results of an investigation undertaken by Dr. KLEIN to ascertain the relative value of these two acids as disinfectants, the question sought to be answered concerning each compound being not so much as to its ability to restrain the vegetation of any specific microphyte as its ability to destroy the power which the microphyte possesses of directly or indirectly producing disease. It may be stated at once that both the acids proved to possess powerful disinfecting properties, and the results obtained with phenylpropionic acid exceeded those attributed to phenylacetic acid. But there seems to be a doubt (which cannot just now be settled, in consequence of the absence of Dr. KLEIN from England) whether the latter acid was used in the free state or combined with an alkali, and considering the inferior relative activity of the alkaline compounds of the closely allied salicylic acid it is hardly safe to assume the disparity between phenylpropionic and phenylacetic acids as having been demonstrated. The results are, however, not to be so simply stated, since the condition of the microphyte proved to be a most important factor. For instance, the morbific bacillus anthracis was experimented with in its two life phases, the spores and the rods or bacilli, and the spores were found to be incomparably more resistent than the bacilli to the influence of the acid. In fact the spores after being subjected to the action of a half per cent. solution (1 in 200) of either of the acids during forty-eight hours were found to be still capable of producing the disease in its unmitigated form. But a solution of half that strength (1 in 400) was found to kill the virus of anthrax in the form of bacilli (the form in which it ordinarily exists in the circulating blood), even when the time of its action was shortened to the utmost, whilst a solution of even one-tenth the strength (1 in 2000) rendered it completely inert in twenty minutes or half an hour. It has been completely established, therefore, that provided the virus is free from spores, the activity of this most virulent of all contagia can be annulled by minute quantities of phenylpropionic or phenylacetic acid. Incidentally a most interesting observation was made whilst testing the action of these acids upon different liquids. It was found that the bacillus as occurring in blood taken from an animal dead from anthrax was much more easily rendered inert than as occurring in a cultivation from the same blood shortly after it had been first started ; indeed the re-

sistent power of the cultivation liquid was found to increase during a week or ten days, after which it decreased, becoming less than that of the blood itself, but to what extent has not yet been determined. One point of practical interest, at least, was determined, namely, that in all the experiments the destruction of virulence was seen to correspond with the loss of vitality of the bacillus. When a specimen of blood after treatment with one of the acids proved to be still capable of developing bacilli upon being placed in a favourable medium it always also proved capable of reproducing the disease in an animal inoculated with it; but those specimens which failed to develop the characteristic bacilli in a cultivation liquid also proved harmless when inoculated into an animal. The operation of phenylpropionic and phenylacetic acids upon the virus of swine plague was found to closely resemble that on anthrax virus. But tuberculous virus showed a much greater power of resistance to these particular disinfectants, appearing to be comparable with bacillus anthracis in its spore phase rather than that of rods.

Another investigation reported upon by Dr. KLEIN is the application of chlorine as an air disinfectant, especially in respect to swine disease. It has been shown that this disease is highly infectious, and that the infection is easily conveyed by the air, which is the usual manner of the communication of the disease. It was therefore considered by Dr. KLEIN to be specially suited for ascertaining experimentally the gaseous substance by which it could be best combated. It is known that a healthy pig placed in the same stable with a diseased one is sure to take the disease though the animals are carefully kept apart from each other. Dr. KLEIN therefore experimented as to the extent to which this atmospheric communicability obtained in an atmosphere impregnated with as much chlorine as the animals could endure without evincing discomfort. It was found that a healthy animal could with safety be placed in the same compartment with a diseased pig, even for so long a time as six hours, for five successive days, provided the air in the compartment was maintained well fumigated with chlorine gas, two good fumigations up to a marked pungency in the six hours being required. It was also found that one good fumigation with chlorine neutralized effectually the virus in a compartment from which a diseased pig had been removed, so that another animal could be placed in it without danger of infection.

At the Fall Assizes, London, Toronto, a drug clerk was tried on a charge of manslaughter in having caused the death of two children in having supplied strychnine in the place of santonin. Evidence was given of the discovery of strychnine in the stomach of one of the children, and the defence seems to have been directed to suggesting that santonin was supplied which might in some way have become contaminated with strychnine. The jury returned a verdict of guilty, and the prisoner was sentenced to imprisonment without hard labour for six months; but was again brought up before the close of the sessions and ordered to be discharged.

* * *

We understand that His Majesty the King of the Belgians has intimated his willingness to accept the "Haut Protectorat" of the Sixth International Pharmaceutical Congress, to be held in Brussels in the course of next year. The Minister of the Interior and of Education and the Burgomaster of the city of Brussels have also accepted nomination as Honorary Presidents.

* * *

The Graham Gold Medal, founded in memory of the late Professor Graham, which is awarded triennially for the best chemical research during the preceding three years, provided that a paper embodying the results of the research has been read before the Chemical Section of the Glasgow Philosophical Society, was last week presented to Mr. Edward C. C. Stanford, in recognition of the merit of his research upon "Algin."

* * *

At the last annual meeting of the Swiss Pharmaceutical Association five members were appointed as a committee to report to the meeting next year upon the establishment of a permanent Pharmacopœia Committee.

* * *

Besides the vegetable products enumerated last week, Mr. Consul Gardner mentions as being used as medicines in China, the "tumble-dung" beetle, tiger bones, the cast pupal shell of the cicada, honeycomb, magpie-dung, scales of the "pangolin" (*Manis javanica*), snake skins, wasps' nests, and a fossil known by the Chinese as "stone swallows," ground into powder.

* * *

Mr. Consul Hall, reporting on the trade of Nagasaki, says that seven-eighths of the camphor exported from Japan goes into the Hong-kong market, where it has to compete with the supply from the island of Formosa. He states that the camphor tree is found all over the island of Kiusiu, of which Nagasaki is the port; but that the supply of the drug from the Satsuma district is both the most copious and the best in quality. The destruction of the camphor forests still goes on; no effort is made to replace the trees cut down, for the simple reason that the tree is of so slow a growth that none but large capitalists could afford to wait the many years that would have to elapse before a camphor plantation would become a source of profit.

* * *

It is announced that in commemoration of the visit of the British Association to Canada a sum of upwards of £500 has been subscribed to form a fund to found a gold medal to be awarded annually in the Faculty of Applied Science at the McGill University, Montreal.

* * *

We understand that Mr. H. B. Baildon has been elected a Fellow of the Royal Society of Edinburgh.

* * *

A substance that has been praised and prescribed in the United States under the name of "carbonate of titanium" proves upon analysis to consist of a mixture of carbonate and oxide of iron with silica.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth meeting of the seventh session was held in the house of the Pharmaceutical Society, 36, York Place, on the evening of Wednesday, 17th December, at 9.15.

Mr. W. S. Turnbull, President, occupied the chair. There was a large attendance. The minutes of the former meeting were read and confirmed.

On the call of the Chairman, Mr. Thomas Stephenson read a paper entitled—

The Life of a Plant.

BY THOMAS STEPHENSON.

Although the study of vegetable physiology is not directly connected with pharmacy, it is, nevertheless, of considerable interest to all who care to pursue the study of botany a little farther than it is absolutely necessary to do in order to pass their examinations.

It is not my intention, gentlemen, to describe the elementary principles of botany, which I presume you are already well acquainted with. And I wish to-night to enter into the processes of plant life in greater detail, and also to view them in the light of the most recent researches.

The simplest form of growth is that which is seen in the formation of crystals. In this case the growth consists simply in the apposition of fresh particles in a definite direction.

Plant growth, however, is very much more complicated, though the apparent causes are very simple. When a seed is put into the ground, we expect that from nothing but air, earth, and water, it will grow up and form a perfect plant.

If we examine any ordinary seed, such as a bean, we find that it consists of an embryo plant and two fleshy lobes. These latter are called the cotyledons, and contain enough of nourishment stored up to give the young plant a start in life. If the seed be planted, the young plant begins to grow, sending a root downwards, and a stem and leaves upwards, while the cotyledons gradually die away.

Its patrimony being exhausted, the plant must now live on its own account, and manufacture its own tissues from all the nourishment accessible to it, viz., air, water, and any soluble matter which the water may dissolve out of the earth.

It is this process of nutrition which we have to consider to-night; and as the nutrition of the lower plants forms a special study in itself, I shall confine myself to the higher dicotyledonous and monocotyledonous plants.

In a typical plant, the root absorbs water containing mineral matter in solution from the soil. This nutriment is conveyed to the leaves and other green parts of the plant, where it meets with carbon dioxide from the atmosphere; the CO_2 and H_2O react, forming starch and giving oxygen back to the air, while the assimilated substances are conveyed to all parts of the plant for nutrition.

In considering the subject in detail, it will be necessary to consider; first, the food required; second, the means of obtaining this food; third, the processes of assimilation and respiration, and lastly, the influence of external conditions on the vital processes.

1. *The Food.*—The food required by a plant can best be ascertained by an analysis of the plant itself. If a plant be dried at a gentle heat so as to expel all the water it contains, we find that it loses from $\frac{2}{3}$ to $\frac{4}{5}$ of its entire weight, so that water must be the most predominant constituent of plants.

If we take the dried plant and burn it, we find that it disappears entirely, with the exception of a very small and varying percentage of ash. Tobacco smoking forms a practical illustration of this.

Chemical analysis shows that the combustible portion of all plants consists of carbon, hydrogen, oxygen, nitrogen, and sulphur, this last remaining in the ash in the form of sulphates. The ash consists of salts of potassium, calcium, magnesium, iron, and phosphorus, generally also sodium, silicon and chlorine, and, in marine plants, iodine and bromine. Leaving the water, therefore, for the present, out of the question, we may conveniently class the chemical constituents of plants under two heads, viz., the organic or essential elements, C, H, O, N, and S, and inorganic or accidental elements, represented by the ash.

Cellulose, of which all plant tissue is composed, is made up of carbon, hydrogen and oxygen, being in fact, identical in composition with starch, into which it can be converted by treatment with sulphuric acid, so as to give the characteristic blue reaction with iodine. This cellulose forms as it were the skeleton of the plant.

The living part of the plant consists of protoplasm, which is an albuminous body consisting of carbon, hydrogen, oxygen, and nitrogen with sulphur.

Carbon is the most abundant element in plants, constituting about one-half the entire weight of the dried substance. It is obtained almost exclusively by the decomposition of the CO_2 of the atmosphere in the cells which contain chlorophyll, a process to be be explained later on.

Hydrogen enters into the plant in combination with oxygen, as water, and possibly also with nitrogen as ammonia.

Oxygen is taken into plants both in combination with carbon as CO_2 and hydrogen as water.

Nitrogen is not obtained from the air, but must enter the plant in the form of nitrates, or an ammoniacal salt. (The manner in which nitrogenous compounds are obtained by carnivorous plants has already been treated in an able paper on that subject by Mr. Duncan.)

Sulphur is probably taken up as calcic sulphate, which is decomposed by the oxalic acid always present in the plant (caused by the oxidation of the woody tissue) forming the crystals of oxalate of lime, so commonly seen in plants, the sulphuric acid thus liberated giving up its sulphur in the production of albuminoids.

The inorganic constituents of plants must now be considered. These are more numerous than the organic, and, though they do not enter into the composition of the vital parts of the plant, are, nevertheless, absolutely essential for the carrying out of their various functions, it having been found by actual experiment that growth is imperfect, and sometimes impossible, without the presence of a certain proportion of inorganic salts. The most important inorganic elements which enter into the composition of plants are potassium, iron, magnesium, calcium, phosphorus and chlorine, and sometimes sodium and silicon.

The part which potassium plays in the vegetable economy is as yet but little understood, but it is considered to be essential in the formation of starch by the chlorophyll. Deliquescent salts of potassium are also often present in the cell sap to prevent evaporation. A certain quantity of mineral ash, consisting largely of potassium salts, has been found to be absolutely necessary in green parts of the plant, for the proper carrying out of the functions of the chlorophyll, but like many other known facts in science, the reason of this has not yet been satisfactorily explained.

Iron has been found to be necessary for the proper formation of chlorophyll, it having been observed that plants which have become pale, may, like human beings under similar circumstances, have their colour restored by the administration of some preparation of iron, and that no green colour can be produced without the presence of iron in the soil. The cause of this is, however, unknown.

Magnesium and *Sodium* also appear to be essential elements, although no special function has as yet been assigned to them.

Silicon is to be found in the stems of such plants as grasses, and in the cell wall of diatoms, in which the function appears to be the stiffening and strengthening of the parts. It is doubtful, however, whether or not silicon is really essential to the plant, as plants are known to be perfect without the presence of silicon, and the prevailing opinion appears to be that its presence in plants is, to a great extent at least, accidental.

Chlorine has been found to be present, but as plants can grow equally well without it, it is probably accidental also.

Iodine is also found in sea plants, which form one of the chief sources of that substance.

Fluorine is also supposed to be present, as it is found in herbivorous animals.

Phosphoric Acid appears to stand in a certain relation to the production of albuminoids.

Calcium seems to act as a vehicle for sulphuric acid, and also for precipitating the oxalic acid continuously being formed, and which is injurious to the plant. It is thus that crystals of oxalate of lime are so abundant in certain parts of the plant.

When plants are grown in fluids which contain all the substances essential for their life, it is found that the substances in solution are not taken up indiscriminately, but that different species of plants supply their wants in different ways. Plants, therefore, appear to have the power of selecting for themselves the substances necessary for their growth. Leguminosæ are specially dependent on lime, potatoes and turnips on potash, and cereals and grasses on silica.

It is on this fact that the principle of rotation of crops is founded. During one year, a certain kind of grain exhausts the soil of its own inorganic materials, requiring next year a crop which feeds on different salts, and so on until the soil has again been replenished from other causes.

The system of manuring also depends on the principle that plants require different inorganic salts to feed upon.

2. *The Manner in which this Food is obtained.*—The organ which is chiefly concerned in the nutrition of the plant is the root. This organ may be defined as that part of the plant which fixes it in the substratum from which it derives nourishment. This definition does not apply in both particulars to all plants, some roots, as those of seaweeds, being solely for fixation, and some, as in the duckweed, simply for nutrition. We have, however, at present to deal with only the nutritive functions of the root.

In most text-books it is stated that absorption takes place only at the tip of the root, which has, on that account, received the name of "spongiole." It has since been observed that this spongiole, now called the "root-cap," acts simply as a sheath to protect the growing point which lies immediately behind it. It is the hairs on the epidermis of the root, and these only, which take in nourishment. These hairs are outgrowths of the epidermal cells, and, like all other cells, are filled with protoplasm and cell-sap. Being very delicate, these hairs are easily affected by gravitation, so as to lie alongside all the particles of soil in their vicinity. The moisture adhering to these particles of soil is absorbed into the hair through the thin cellulose wall, by a process known as endosmose. This process is based on the fact that when two liquids of different densities are separated by any thin organic membrane they tend to change places, the less dense liquid passing through the membrane proportionately faster than the denser one. In the case before us we have the water in the soil separated from the more dense cell-sap by the thin membrane of the root-hair, and thus by the law of endosmose the water enters the root-hair more quickly than the cell-sap comes out. The water thus absorbed contains, in solution, the various inorganic salts necessary for the life of the plant. Carbonate and sulphate of lime and other salts, insoluble in water, are dissolved by the oxalic acid which is always present in the cell sap, from causes already mentioned, and are thus absorbed.

In aquatic plants, as the greater part of the plant is entirely surrounded by water, it requires few, if any, special organs for the absorption of fluid. The roots are therefore either rudimentary or entirely absent. In the duck-weed, for example, the root consists of a single long thread, furnished with a root-cap at the end. Absorption takes place from the whole surface of this root, there being no root-hairs.

The roots of some orchids which grow on the branches of trees never touch the ground, but derive all their nourishment from the air. Such plants are called "epiphytes." The outer cells of the root are called "velamen," and have the property of absorbing watery vapour from the air.

That class of plants called "parasites" also deserves passing notice. These do not derive nourishment from the ground, but get it from a "host." Take, for example, a plant which will acquire great importance in society during the next few weeks—the mistletoe. This, however, is only a partial parasite, because, having green leaves of its own, it requires to take in from its "host" only water containing mineral matter in solution, this sap being elaborated in the leaves. The root is of peculiar construction, one tap-root descending directly into the wood, while two lateral adventitious roots lie along between the wood and the bark.

The dodder is, perhaps, the best example of a parasitic plant. Unlike the mistletoe, it spends part of its life growing in the ground in a normal fashion. In this state it consists of a root and a long slender stem, the end of which gropes about till it finds a plant (preferably clover) to which it fastens itself, and at the expense of which it lives all the rest of its life, the other part of the stem, together with the root, dying away. When the stem finds a host, it coils round it and sends out brush-like roots to the bast of its host, whence it derives nourishment; in this case, however, fully elaborated and ready for use. When its host dies, the dodder finds its way to another, and often spreads so rapidly as to ruin a whole clover field in a short time.

Having considered the manner in which the fluid is absorbed by the root, we must now consider how it is to be conveyed to the various parts of the plant. We have already seen, that about 75 per cent. by weight of the plant consists of water, and that, without that element, life is impossible. In many plants there is also a continual loss of water from the leaves by evaporation. To meet these requirements it is therefore necessary that currents of water should continually pass through the plant in all directions. The old theory of "ascending and descending sap" is therefore untenable, as the sap has to go wherever it is required, which is sometimes up, sometimes down, and sometimes in a lateral direction, finally passing out of the plant in the form of vapour by "transpiration." The causes of these movements are chiefly capillarity and endosmose, but there is also a process of suction caused by the evaporation of water from the leaves, and also another force called "root-pressure." When the roots absorb more water than the plant requires, this exercises a pressure which drives the water further up the stem. This water exudes on the margins of the leaves, and as it often gathers on the leaves during night, it is frequently mistaken for dew in the morning. The phenomenon of bleeding, which is seen in trees which have had their branches cut off in spring, is owing either to root-pressure, or to the expansion of air in the plant, caused by variations in temperature, thus driving out the water wherever there is an outlet.

We have now arrived at the most important part of our subject, viz., the processes of assimilation and metastasis. Assimilation is the conversion of the crude materials into substances, such as starch, which may either be used at once for the nutrition of the plant, or stored away for future use. Metastasis is the conversion

of these "reserve materials" into new cells, and also into what are called secondary products, and are of no further use to the plant, such as alkaloids, resins, volatile oils, tannin, gums, etc. While the process of metastasis can take place under any circumstances, that of assimilation requires special conditions for its proper fulfilment. These conditions are—(1) the presence of the green-colouring matter called chlorophyll; (2) sunlight. Any green part of the plant, therefore, which is exposed to light is capable of assimilating, or, in other words, of manufacturing starch from the crude materials. The leaves, however, are the organs chiefly devoted to this purpose, their various parts being specially adapted for this.

The outside of a leaf is covered by a thin layer of cells called the epidermis. This layer contains no chlorophyll, and, therefore, does not manufacture; it simply acts as a protective, and prevents undue evaporation. The epidermis is provided with openings called "stomata," for the entrance of the carbon dioxide in the air, the carbon of which the plant assimilates, giving back oxygen—a process to be detailed later on.

Each stoma consists of two crescent-shaped cells called "guard cells." By a peculiar arrangement, which I have not time to detail, these cells separate from one another during sunlight, and come together again in the dark, and thus the stoma opens and closes. These stomata are usually situated on the under side of the leaf.

The middle portion of the leaf consists of cells containing chlorophyll. The cells near the upper surface of the leaf, and consequently nearer the light, have more chlorophyll, are long in shape, and are arranged side by side in rows very suggestive of the title given to them of "palisade cells." The cells below these are arranged more loosely, so as to allow free passage of air, and also the evaporation of water, in order that the inorganic salts necessary for assimilation may be more abundantly deposited. These cells are called "spongy parenchyma."

A closer look will show that the chlorophyll is not diffused throughout the cells, but is arranged in round granules. Each granule consists of a network of protoplasm, in which the green chlorophyll is embedded. It is the protoplasm which does the work, the green chlorophyll acting only as a shade to protect it from too intense light.

The crude sap from the roots is carried to every part of the leaf by a system of fibro-vascular bundles. A great part of this sap deposits its mineral matter in the lower portion of the leaf, the watery vapour passing through the stomata. The rest is converted into starch in the following manner: the CO_2 entering by the stomata meets with the H_2O which has been sent up from the roots forming starch and liberating oxygen, thus—

$$6\,CO_2 + 5\,H_2O = C_6H_{10}O_5 + 6\,O_2$$

It will be seen from this equation that the same volume (6 molecules) of oxygen is given out as of carbon dioxide taken in, and this having been proved by actual experiment has, until recently, been looked upon as the reaction which really takes place. Pringsheim, however, in his researches has found an intermediate product, which, from its property of reducing silver salts, he takes to be an aldehyde. He gives the following as the reaction, the volume of gases taken in and given out being the same in this case also—

$$CO_2 + H_2O = CH_2O + O_2$$

(Formic aldehyde).

The formic aldehyde thus formed is by polymerism converted into glucose or grape sugar:—

$$6\,CH_2O = C_6H_{12}O_6$$

In this soluble form it is carried through the tissues, and where it is to be stored away, it is converted into starch by the subtraction of an atom of water.

$$C_6H_{12}O_6 - H_2O = C_6H_{10}O_5$$

From the starch thus formed, albumen, cellulose, protoplasm, and all other constituents of plants are made by the process of metastasis. As there is a different process for the formation of each substance, and as these processes have not yet been thoroughly investigated, it is needless here to enter into them.

The process of respiration in plants must not be confounded with assimilation. The process of assimilation, or inhalation of CO_2, and exhalation of oxygen, takes place only during sunlight and in the green parts of the plant, as we have seen, whereas there is simultaneously and continuously going on in all cells of the plant a process exactly similar to the respiration of animals, namely, an inhalation of oxygen and exhalation of CO_2. The organic substances are being continually oxidized by the oxygen of the air, giving off part of their carbon in the form of carbon dioxide. While assimilation is going on, however, this carbon dioxide is continually taken up again to form starch before it has left the plant, so that to all appearance the plant does not exhale CO_2 at all during the day.

It was formerly thought that plants inhaled carbon dioxide during the day, and that at night the process was reversed, oxygen being taken in and carbon dioxide given off. This we have seen to be true, as far as appearance is concerned, while really CO_2 is being always given off, though during the day it is not allowed to leave the plant.

There is, therefore, no difference between the respiration of animals and that of plants, both consisting in the oxidation of the carbon in organic tissues, but to confuse the respiration of plants with assimilation would be as inconsistent as to speak of an animal inhaling its food.

A plant, when kept in an atmosphere of CO_2, will die exactly as an animal does, as it is in a condition similar to that of an animal which is supplied with plenty of food but no air.

In many cases the process of respiration causes considerable elevations of temperature, as may be seen by placing a thermometer in a heap of germinating peas.

It remains for us now to consider briefly the influence of external conditions on plant life. It is well known that plant growth can take place only within certain temperatures. The lowest of these is 0° C. (32° F.) at which the water freezes, and the highest is from 40° to 50° C. (about 120° F.) at which temperature the albumen coagulates. Some plants, however, in which the water is protected, can live while the temperature is below the freezing point; and some bacteria have been seen to live in boiling water, having apparently incoagulable albumen.

From 20° to 30° C. (75 F.) is the best temperature for plants to live in.

The annual rings in wood are a good example of the effect of external conditions. Owing to variations of heat, food, etc., the cambium works at greater pressure towards the end of the year, thus producing denser wood. Any number of rings can be artificially produced in one year by simply tying a ligature round the stem, and alternately tightening and loosening this ligature.

The action of light on vegetation has already been considered.

The effect of gravitation on a plant is a tendency to grow downwards. To counteract this influence, many contrivances are present in the stem, such as the firmness of the wood, the uniform distribution of foliage and branches, climbing appliances such as tendrils, and, in many water plants, air-bladders.

Owing to the great variety of conditions to which they are exposed, all plants possess a certain power of adaptation to their external conditions.

There are two forces which I have time to allude to only very briefly. These are heliotropism and geotropism. Heliotropism is the force which makes the stem grow upwards, geotropism that which makes the root grow downwards. Light and gravitation combined seem to be the chief causes of these phenomena. But I must refer

you for further information to Darwin's exhaustive work on the subject.

After this short sketch of what is already known on the subject, you will see that a vast deal remains yet to be discovered, much of which is of great interest to pharmacists, and the discovery of which might with advantage be undertaken by pharmacists themselves.

Almost nothing, for example, is as yet known about the formation of alkaloids; whether they are really useful to the plant or merely accidental, can only be conjectured.

It is known from experience that plants possess more therapeutic activity at certain periods of their growth, but the discovery of a scientific law, which would enable the cultivators of medicinal plants to bring these plants to the greatest perfection remains yet to be made.

This is only one of the many as yet unsolved problems, the working out of which would form an interesting and profitable study, and would prove that botany, however much it has been condemned for its predominance of hard names, is one of the most interesting departments of natural science.

An interesting discussion on the paper was opened by the Chairman, who moved a hearty vote of thanks to the essayist. Mr. Hill seconded the motion, specially mentioning the beautiful diagrams with which Mr. Stephenson illustrated his paper. Messrs Henry, MacEwan, McRither, and Pirie also commented on the essay. Mr. Stephenson briefly replied.

Queries were then submitted and answered, after which the Chairman intimated that the next meeting (an open meeting) will be held on 7th January, 1885.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of the above Society was held on December 18, Dr. Russell, F.R.S., in the chair.

The following certificates were read for the first time:—N. F. Dutton, R. Dormer, A. G. Green, G. G. Henderson, W. A. Wrenn, A. C. Wilson, A. C. Young, H. H. Whitehead.

During the evening a ballot was held and the following gentlemen were declared by the Scrutators, Messrs. Wilson and Cresswell, to be duly elected Fellows of the Society:—W. P. Ashe, Sir B. V. S. Brodie, Bart., W. Briggs, J. F. Ballard, M. T. Buchanan, W. G. Brown, H. M. Chapman, W. H. Eley, J. Frost, T. P. Hall, H. J. Hodges, H. Jackson, F. Johnson, J. D. Johnstone, G. F. Kendall, C. W. Low, F. M. Mercer, P. C. Porter, V. E. Perez, A. Rickard, K. B. B. Sorabji, R. R. Steele, H. Smith, E. G. Smith, G. Thorn, W. Tate, P. C. Thomas, T. Wilton, J. H. Worrall, W. C. Wise, W. H. Wood.

The Secretary read the following paper—

Chemico-Physiological Investigations on the Cephalopod Liver and its Identity as a true Pancreas. By A. B. Griffiths.—The author has carefully dissected out this organ from a fresh cuttle-fish. He found that a small portion of the organ converted starch paste into dextrose. The organ was alkaline and emulsified oil; it rendered milk transparent. Under the microscope a small portion gave a brown deposit with iodine, and a yellow colour with nitric acid. The author obtained a glycerin extract of the organ in the usual way, and precipitated a ferment from the glycerin solution by alcohol. This ferment converted starch into dextrose and formed from the fibrin taken from the muscular fibres of a young mouse leucin and tyrosin, the latter body giving with a neutral solution of mercuric nitrate a red precipitate, which reaction is stated by the author to be characteristic of tyrosin. The author could not detect any bile acids or glycogen, and concludes that the organ is more like a pancreas than a liver.

The Society then adjourned to January 15, when a paper on the "Atomic Weight of Titanium" will be read by Professor Thorpe. It was also announced that a lecture would be given by Dr. Frankland, probably in February, on "Chemical Changes produced by Micro-organisms.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, W.C., on Wednesday, December 17, at 4 p.m.

Present:—Professor Attfield (Vice-President) in the chair; Messrs. Atkins, Benger, Carteighe, Ekin, Hills, Naylor, Symons and Williams, and Mr. Plowman and Dr. Thresh (Hon. Gen. Secs.).

The minutes of the previous meeting were read and confirmed.

Letters of apology for non-attendance were read from Mr. J. B. Stephenson (President), and Messrs. Borland, Dott, Groves, Sim, Strachan and Umney.

Mr. Louis Siebold, F.I.C., F.C.S., was re-appointed Editor of the 'Year-Book of Pharmacy' for 1885.

A letter was read from Messrs Butler and Tanner, the printers of the Year-Book, stating that such progress had been made with the 1884 volume that they would be able to deliver some copies by the end of the year.

Mr. Plowman (Honorary General Secretary) presented a report on the Colonial business of the Conference. He thought sufficient time had now elapsed for the Committee to form an opinion as to the results of the effort to extend the influence of the Conference to the Colonies and India. Since the appointment of the Honorary Colonial Secretaries upwards of 150 applications for membership had been received from the Colonies and India. He had received a number of letters from Colonial pharmacists, expressing interest in the proceedings of the Conference and approval of its objects, and some of his correspondents had promised communications and papers on certain native products about which little was known in the United Kingdom.

The Committee decided that when the Year-Book could be sent free of cost to a Colonial Secretary for distribution in his district the subscription should be the same for members in that district as for home members, viz., 7*s.* 6*d.*

The question of the publication of a general index for the Year-Books already issued was raised. The Committee decided on financial grounds that if it were prepared copies could not be presented to members. But the Honorary General Secretaries were instructed to ascertain how many members of the Conference would be willing to subscribe towards its production.

In accordance with a previous resolution of the Committee, the Honorary General Secretaries were instructed to issue early in 1885 an invitation to membership to all registered chemists and druggists to whom it had not previously been sent.

The Honorary General Secretaries reported that the second moiety of the grant of £10 to Messrs. Dunstan and Ransom to further extend the method of alkaloidal extraction with the chloroform-alcohol mixture had been paid since the last meeting of the Executive Committee.

Mr. Plowman said he had been asked by several members to obtain the opinion of the Committee as to the desirability of distributing among members present at the annual meetings proof copies of papers read at those meetings. The Committee came the conclusion that this could not well be done.

The date of the next annual meeting of the Conference was fixed, and it was announced to take place at Aberdeen on Tuesday and Wednesday, September 8 and 9, 1885.

The thanks of the Conference were accorded to Mr. H. Shillinglaw, Hon. Sec. for Victoria, for forwarding a copy

of the Articles of Association of the Pharmaceutical Society of Australasia, and to Mr. L. B. Bush, Hon. Sec. for New South Wales, for a copy of the Eighth Annual Report of the Pharmaceutical Society of N.S.W.

Ninety-five members were elected.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, December 18, Mr. T. S. Dymond, Vice-President, in the chair.

The following paper was read on—

Ionidium Ipecacuanha.

BY J. B. BARNES, JUN.

A short time ago Mr. Holmes called my attention to a sample of Rio Ipecacuanha root and asked me to examine it with the view of ascertaining whether all that had been said concerning its reputed emetic properties was correct, and of trying moreover to isolate the active principle. I have made several experiments, both chemical and physiological, having these objects in view, the results of which I will now bring before you. The root is sent over from Brazil to the London markets from time to time and put up for sale as true Ipecacuanha; as a rule nobody buys it, so like a good many other drugs it has to be reshipped at the consigner's expense. For this reason retail pharmacists have seen little or nothing of it, although it is well known to our wholesale brethren.

The plant which yields Rio Ipecacuanha belongs to the Natural Order Violaceæ, not to the Rubiaceæ like true Ipecacuanha, and is called *Ionidium Ipecacuanha*. It has also been known by a multitude of names, such as Ipecacuanha Brancha, Viola Itubon, Pombalia Ipecacuanha, Ionidium Itubu, Pombalia Itubu, Poaya, Poaya Branca, False Brazilian Ipecacuanha, White Ipecacuanha, etc. It is a native of Brazil, and is found scattered over a large area extending from the River Amazon to Cape Frio, and as its name indicates is imported from Rio Janeiro.

The earliest mention, I believe, of this drug is made in the *Journal de Pharmacie* for 1817, in a paper by Pelletier and Magendie, where the plant is described and a chemical analysis given. It has doubtless for centuries been well known to the Brazilians, who are said to value it as much as the official drug.

The root, which occurs in pieces varying very much in size, is developed at the upper end into a knotty crown having numerous aerial stems, generally about an inch long, attached. Below the crown is a simple tap root, varying in thickness from $\frac{3}{8}$ to $\frac{1}{16}$ of an inch, and in length from 2 to 4 inches or more, twisted and divided into two or three branches and smaller filiform rootlets. The comparatively thin bark is light greyish brown, wrinkled and shrivelled longitudinally with occasional transverse markings; the inner woody portion is lighter in colour and appears to be very fibrous; the fracture, however, is short and brittle. It has a somewhat druggy smell and little or no taste. A transverse section exhibits several concentric zones and some radiating fissures. There can be no possibility of confounding this root with true annulated ipecacuanha, as in no one particular does the former possess characters which resemble the latter.

On looking up the chemical investigations that have been published, I find that first Pelletier and Magendie (*Journ. de Pharm.*, iii., 158, 1817) give the following as the analysis of the root:—

Emetine	5
Gum	35
Matière vegeto-animal	1
Woody fibre	57
Loss	2
	100

Three years later Richard published (*Journ. de Pharm.*, vi., 264, 1820) the following as the composition:—

Emetine, containing a little saccharine matter	3·5
Starch	54
Extractive matter soluble in water, containing a new crystallizable principle	22
Wood fibre	19
Gallic acid, traces.	

These, I believe, are the only analyses that have been made. The process seems to be as far as I can make out the treatment of an evaporated aqueous decoction of the root with alcohol, the filtered product yielding on evaporation the so-called emetine. At the same time that Pelletier and Magendie published the above they also examined *Cephaelis Ipecacuanha*, finding 16 per cent. of emetine. This, however, is well known to be much too high, and their product must have been very impure as it is now universally admitted that ipecacuanha does not contain more than 1 per cent. of pure emetine. The wide variation between these two percentages points to it being more than probable that the quantity of emetine found in Ionidium was also greatly overestimated.

As a preliminary test for the presence of emetine I took 20 grains of the powdered root, mixed it with 6 grains of slacked lime, made into a paste with water, dried over a water-bath, and put the resulting powder into a small vial with $\frac{1}{2}$ ounce of chloroform. After allowing the whole to macerate with occasional agitation for twelve hours the chloroformic solution was filtered into a small capsule containing two or three drops of acetic acid and a gentle heat applied till the chloroform was dissipated, a few drops of water were then added; this solution yielded no precipitate on the addition of potassium nitrate or tannic acid. At the same time I worked side by side with the above a sample of official ipecacuanha which, treated in the same way yielded copious precipitates both with potassium nitrate and tannic acid, and the resulting nitrate of emetine of the first experiment gave the characteristic yellow colour when treated with a drop of acetic acid and a few drops of solution of chlorinated lime. Failing to get reactions for emetine in the above manner 100 grains of the powdered root were mixed with 24 grains of slacked lime and a little water and dried as before, $1\frac{1}{2}$ oz. of a mixture of equal parts of chloroform and absolute alcohol added, and the whole boiled for an hour in a flask fitted with a long condensing tube, the solution filtered, and the marc washed with $\frac{1}{2}$ ounce more of the mixture. The result was a slightly yellow coloured liquid which on evaporation yielded a small quantity of resinous matter of pale yellow colour soluble in ether and chloroform, and when treated with dilute sulphuric acid the resulting acid liquid gave no precipitate with Meyer's reagent, solution of iodide of bismuth and potassium or tannic acid; it also had no bitter taste and when boiled for some time failed to reduce Fehling's solution.

It will be seen that these processes failed to give me any indication of an alkaloid or glucoside, so the next thing that suggested itself was the probability of the presence of violine, as the drug belongs to the natural order Violaceæ. The process employed is based on the one given by Boullay for the isolation of violine from *Viola odorata*, making use of an organic instead of an inorganic acid. One thousand grains of the powdered root were exhausted by maceration and percolation, first with rectified spirit and then proof spirit, the percolates mixed, the spirit recovered by distillation and the residue evaporated over a water-bath till nearly dry; the small quantity of extract thus obtained was treated with solution of citric acid, filtered, excess of potassium bicarbonate added to the filtrate and the whole evaporated to dryness, the residue was then treated with absolute alcohol, solution filtered, evaporated and water acidulated with sulphuric acid added.

This furnished a slightly coloured solution which was

rendered colourless by adding excess of ammonia, shaking with chloroform, separating the chloroformic solution by means of a pipette, allowing it to evaporate and again treating the residue with acidulated water.

A drop or two of this solution on a watch glass gives characteristic precipitates with the following alkaloidal reagents, Meyer's reagent, iodide of bismuth and potassium and phosphomolybdic acid; it also gives a precipitate with tannic acid, but neither potassium nitrate, sodium bicarbonate nor ammonia give any precipitate. The solution is intensely bitter. The residue from the chloroformic solution before treatment with acidulated water is soluble in ether, chloroform and absolute alcohol, but only slightly soluble in water; the quantity obtained, however, was so small that I am unable to say much about it. The fact of its not yielding an insoluble nitrate and its being soluble in ether disprove its identity with either emetine or violine.

The root also contains a resin having a peculiar odour, which does not reduce Fehling.

Kraus, in his investigation of the occurrence of inulin in plants other than the Compositæ, mentions the presence of it in Ionidium Ipecacuanha. This can be easily proved by boiling a filtered decoction of the root with diluted sulphuric acid and adding Fehling's solution, which is at once reduced.

All authorities seem to be agreed as to the therapeutic properties of this drug. St. Hilaire, in his 'Plantes usuelles des Brasiliens,' 1827–28, gives a short account of its uses, the following being an abbreviated translation:—"All the world knows that the roots of this plant have emetic properties and can be used instead of *Cephaelis Ipecacuanha*. It is the best remedy for dysentery. The inhabitants of the Rio-Grande-do-Norte assert it to be a radical cure for gout; they take it in the form of a decoction." He could not confirm these statements, but thought it possessed sufficient importance to merit the attention of the faculty. Pereira (vol. ii., Part II., 2061) mentions its emetic properties, and gives the dose as from ½ to 1 drachm in the form of a decoction.

In order to verify the above statements, I made an infusion of ½ ounce of the powdered root in 8 ounces of boiling water, and after allowing it to stand for an hour took the following quantities, viz., 1 ounce, 1 ounce, 2 ounces, at 11.30 a.m., 12 and 7 p.m. respectively, without feeling any nausea or effect of any kind. Similar quantities were taken by our porter without producing any sensible effect. I also took 30 grains of the powdered root, and a dose of tincture equivalent to 33 grains, with the same result. Mr. Short has been good enough to swallow a drachm of the powder, and has indicated to me that he experienced a similar negative result.

These physiological experiments disprove, I think, the statements that have been made with regard to the reputed emetic properties of Ionidium Ipecacuanha. Unfortunately I have been only able to get such a very minute quantity of the substance which gives reactions with alkaloidal reagents that it would be very rash to say much about it; but it appears to differ from emetine in not forming an insoluble nitrate, and its solubility in ether also makes its identity with either emetine or violine appear impossible, as both these alkaloids are said to be insoluble in ether.

A discussion followed in which the Chairman, Secretary, Messrs. Braithwaite, Cripps, Dobb and Eastes, took part.

Mr. J. O. Braithwaite, Reporter on Materia Medica, then made a report, the subject of which was "Erythroxylon Coca and its Alkaloid."

The report was discussed by the Chairman, Secretary, Messrs. Barnes, Cripps, Eastes, Farr, Hoyles, Huskisson, Job and Morrall.

Pursuant to a notice given at the previous meeting, Mr. P. L. Huskisson then moved and Mr. R. A. Cripps seconded the following resolution:—"That in Rule V., after the words 'announced by the Chairman,' the following sentence be inserted:—'In any case of an equality of votes the Chairman of the meeting shall have a casting vote.'"

The resolution being put to the meeting, was carried unanimously, and the Secretary was instructed to submit it for the approval of the Council of the Pharmaceutical Society.

Owing to the lateness of the hour, miscellaneous business was postponed to the next meeting, and the meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting held, December 10, at 103, Great Russell Street, Mr. Winfrey, President, in the chair.

After confirming previous minutes, and proposing new members—

Mr. E. C. Stuart, B.Sc., was called upon to read a paper on "How Plants Grow," which will shortly be published in full.

In the discussion which followed, Messrs. Briggs, Braithwaite, Burnett, Flintan, Talbot and Winfrey took part. Mr. Braithwaite further placed upon the table some papers describing the results of some experiments on embryonal growth.

Notwithstanding the inclement evening, a large attendance was registered, upwards of forty being present, and the occasion proved one of the most interesting and instructive of the session.

SOCIETY OF ARTS.

Mr. Ernest Hart on the International Health Exhibition.

The following passages are taken from the paper on the Health Exhibition, it Influence and Possible Sequels, read before the Society by Mr. Ernest Hart:—

Food Department.—Referring generally to that great bulk of the Exhibition which was occupied by English exhibitors, I would say that, while much reference has been made to the apparently miscellaneous character of many of the exhibits, I know that much care was taken that not one should be admitted which had not an immediate reference to the prescribed programme, and of which the *raison d'être* was not easy to discover. It was perhaps, however, from one point of view, open to exception that the great central avenue should have been taken up with the food display, in which the commercial interest was mainly predominant, and as to which the scientific importance was only determinable when the work of the juries came into play. By these the relative value of the articles exhibited was subjected to a searching test, such as certainly has never before been applied to the ordinary commercial articles of food publicly offered in this country, and to which it is greatly to the credit of the exhibitors that they willingly submitted. There is only one exhibit in this department to which I would specially call your attention: it was that from the collections of the Science and Art Department and the Parkes Museum, illustrating the constituents of food and food values, and the connected exhibit by the Society of Public Analysts, of materials used as adulterants of articles of food; of adulterated articles of food commonly sold in this country; of adulterations which have been suppressed; of adulterations practised abroad, and mixtures generally protected by labelling. This latter was added in consequence of a suggestion made by the late Mr. Wigner, President of the Society of Analysts, at a late date in the progress of the Exhibition. I am afraid that it did not attract all the attention that it deserved. I trust, however, we shall be able to reserve it for continual public reference. Mr. Wigner, in communicating with me, pointed out that although the Exhibition was most

successfully arranged so as to display in a prominent manner all the articles connected with food, yet the public were only shown what is done by the most careful and respectable firms, whose names are a sufficient guarantee that only materials of the highest quality are used in the preparation of the goods which they show.

All who are connected with food produce know how, from time to time, the desire on the part of the consumer for cheap goods is the cause of the introduction of articles called "substitutes," which are offered to the manufacturer at one-third the price of the genuine material, and which frequently consist of some cheap and simple preparation, the very opposite in its chemical character to the article for which it is said to be an efficient substitute: several cases of this kind had recently been brought to Mr. Wigner's notice. For instance, he referred to an article to be used as a substitute for tartaric acid, the composition of which has been found to be acid sulphate of alumina in solution—a substance which, if introduced into the manufacture of bread or biscuits, is as objectionable as alum, and quite as much an adulterant. Bisulphate of potash is also sold under a name similar to tartaric acid, and is equally as worthless as sulphate of alumina. These are only two instances out of many, and serve as an additional argument to show the keen competition in trade, which causes the manufacturer to produce, and unscrupulous firms to sell, such articles under "Royal Letters Patent," or some other heading of this sort, to attract the notice of the consumer.

The public analyst, Mr. Wigner added, although, of course, he should be cognizant of these facts, has quite enough work for the remuneration paid to him, and in addition to this, there is the fact that the Sale of Foods and Drugs Act is so limited in its aim and scope as to practically prevent the analyst from testing anything but the common articles of food, such as bread and milk, unless they are sold under some recognized name. Let him once travel outside these lines, and a whole host of objections are raised. What is really wanted is more stringent legislation, similar in character to that at present in operation in the United States and Paris.

In the French Section were shown the monthly reports of the Municipal Laboratory, showing the complete and thorough manner in which the food supply of that city is protected. Why cannot something of the same sort be done in London? What is wanted is a measure defining what is and what is not adulteration, and prohibiting the use of articles which are frequently employed at the present time, and the sale of which while benefiting one class seriously injures another, by substituting an inferior article for one of better quality.

Considerable good, it may be hoped, was done by the Health Exhibition by the exhibition of these so-called substitutes. The prominent display of this instructional series in a National Exhibition has, we trust, done something towards putting a stop to a trade which, while it enriches the unscrupulous trader, places the honest manufacturer in an awkward position.

How far it has fulfilled this intention is of course not yet apparent, but I shall certainly feel it a part of my duty in another capacity, as Chairman of the Parliamentary Bills Committee of the British Medical Association, to endeavour to keep the attention of our legislators to this important subject. It may be hoped that, when the political horizon is sufficiently cleared to enable Parliament to devote some time to interests of almost as important, if less strictly party character, as those which are now occupying their attention, that it may be possible to secure for the people of England, or at least for the people of this metropolis as an example to other great towns, some of those better securities against the adulteration of food which this country was the first to set the example of creating by legislative action, but as to which it has, at the present moment, fallen behind some of those countries which followed us, such as France, Belgium and America. It is within my knowledge, and in fact within my personal experience, that in all those countries our English legislation was originally the model which they set before them. In fact, in the case of several of these countries, I have had the opportunity of receiving the gentlemen who had been sent over by their various Governments, and of furnishing them in several instances with the opportunities of study and materials of which the respective Governments have availed themselves to create model laws respecting adulteration; I would refer here especially to the German code.

It is hardly to our credit that we have allowed ourselves to be distanced in a race in which we had so considerable a start, and in which the sole goal is the public benefit, and the maintenance of the public health. These are questions largely affecting the health of the whole nation, and especially affecting the welfare of the poor, who suffer most by the substitution of worthless, inferior, or adulterated articles in the fabrication of apparently cheap, but often very dear because worthless, articles of food.

The Health Laboratories.—I pass to the laboratories. It did not at first, I think, appear evident to some of the members of our council how close was the connection between the work to be carried on in these laboratories and the public health. Happily, however, that feeling soon gave way to one of acquiescence in the proposition which I made for the establishment of these laboratories, and, since, a closer examination of the subject has, I think, convinced everyone that it is to establishments of research and of study, such as those over which Mr. Watson Cheyne and Professor Corfield presided, that we must look for the most solid foundations for future progress, in solving the highest problems connected with the preservation of health: and that no part of the Exhibition fulfilled a higher purpose, and to none can we look with more assured hope in the future, than to these departments of the Exhibition. A description of the laboratories appears in the official catalogue, and I shall not occupy your time with any description of them.

At the hygienic laboratory, in its chemical and physical departments, the public were not merely given the opportunity of seeing hygienic analyses of various kinds going on, and of having them explained to them either by Professor Corfield or his assistants, individually or in the form of popular demonstrations—of which a considerable number were given, chiefly by the senior assistant, Mr. C. E. Cassall, during the time the Exhibition was open—but they also had the opportunity of seeing the ordinary working of such a laboratory, from the fact that Professor Corfield was able to utilize this laboratory for his students. A class of about forty teachers, selected by the Science and Art Department from schools in all parts of the country, attended a course of lectures given by him at the Normal School of Science, and at the same time worked in batches in the hygienic laboratory at the Health Exhibition, and thus the public were enabled to form an idea of what such a laboratory is in full working order; and, indeed, during the whole time that the Exhibition was open after the above-mentioned class had dispersed, there were pupils who worked in the laboratory.

In a complete hygienic laboratory there should be a separate part set aside for physical experiments relating to hygienic appliances; but in this laboratory there was barely space for the chemical work to be carried on, and even the microscopical work could only be prosecuted to a limited extent, insomuch that the class of teachers went through their course of microscopy relating to hygiene in the physical laboratory at the Normal School, and the absence of physical appliances was replaced, as far as it could be, by demonstrations given by Professor Corfield at the sanitary and insanitary houses.

As regards the biological laboratory, it is sufficient for my purpose to-night to remind you that in it, Mr. Cheyne, the worthy pupil of Sir Joseph Lister, who acted as chairman of the laboratory sub-committee,

showed by practical working, and by collections such as had never before been seen in this country with the same completeness, the refined methods of research and of teaching by which we are enabled to study the life, history, and the habits, the development, and the means of arresting the development, of those minute organisms which modern science has shown to be prime factors in the causation of a great proportion of the most fatal diseases which afflict our flocks and herds, which decimate mankind, and which attack those plants and animals which constitute the staple of our food supplies. Mr. Cheyne's demonstrations were eagerly followed by health students from all parts of the kingdom. A certain number of tables were set apart for study and research, and these were fully occupied from the first to the last days that the Exhibition was open. In Professor Corfield's laboratory was collected the apparatus for that kind of instruction in the chemical and physical examination of soil, air, water, food, clothing, and materials of house construction, which are essential elements in the education of that great army of medical officers of health who are appointed now under existing Act of Parliament to watch over the health interest of the community. It is very well known, however, that a large majority of those gentlemen have not this necessary instruction, and that at the present moment there does not exist in this country any adequate means for giving such instruction. There are in England one thousand one hundred and two medical officers of health, and nine hundred and ninety-six inspectors of nuisances, all of whom are expected to get their information, and to acquire the technical knowledge of which they stand daily in need, as best they can; and it is well known that a large proportion of them are very imperfectly equipped with the necessary knowledge, and, indeed, can hardly be said to possess even the rudiments of systematic technical education in subjects in which they are presumed to be experts on, which they are called upon to decide in matters largely affecting the pockets of the community, and intimately concerning its health. In order to illustrate the importance of the establishment in this country on a permanent footing of such laboratories as those which are shown in temporary working at the Exhibition, I shall ask leave now to refer you to an exhibit which was made in the French Court, illustrating the work done in a similar laboratory by M. Pasteur to that of which I am now advocating the permanent establishment, as the best possible sequel of this great Exhibition.

M. Pasteur is the scientific director of the Ecole Normale Superieure in Paris, a school especially designed to supply professors in literature and science to the *lycées* or higher schools of France. He is not, however, called upon to undertake teaching, but is expected to devote all his time to his researches. In a word, in consideration of the considerable national services which he has rendered, an exceptional position has been accorded to him. He receives a professorial salary of £400 a year. M. Pasteur is also the head of l'Ecole des Hautes Etudes, of which Mr. Chamberlain is the sub-director. In this laboratory he receives some pupils. He possesses further a laboratory at the Ecole Normale, where M. Roux is his coadjutor, and where are admitted some students, who are generally persons already known for their studies. He has entire freedom of the choice of students of the laboratory Ecole des Hautes Etudes, as well as those of persons who work in his private laboratory at the Ecole Normale. About £800 a year are allowed for this laboratory by the Minister of Public Instruction, and for the last few years, 30,000 francs from the Minister of Commerce and Agriculture. These grants are renewed yearly.

The principal researches of M. Pasteur have related to :—

1. *Wine*, in which he demonstrated that in order to avoid the transformation of alcohol into acid, it is necessary to destroy the germs remaining in wines which are poor in alcohol, by heating them up to 55° C. to 60° C. He has also studied the action of oxygen and light on wine, and has demonstrated that it is to this action, *i.e.*, to the oxidation of the materials of wine, that we are to attribute the development of the bouquet of wine, *i.e.*, the flavour which it acquires with age. In order that this may yield a product appreciated by amateurs, it is necessary that it should proceed slowly. He has further demonstrated that the ferment of wine exists on the surface of the grape when it has ripened. He has demonstrated the useful and precise indications which the areometer furnishes, in order to appreciate during fermentation the state of the *mout* of the grape.

2. *Beer*.—After having demonstrated that brewers employ, generally, a ferment containing, among others, injurious germs, M. Pasteur indicates the following means for obtaining a pure ferment. A small quantity of pure yeast is prepared according to the exact rules of the laboratory. This is introduced into a large copper pan, three-quarters filled with the wort of beer, which has been first carried to the boiling point, and then cooled before the introduction of the yeast. This vessel only communicates with the external air by a long tube of copper, many times bent in such a way as to permit the gases to escape without external germs being able to enter. When the wort has been developed, it is drawn off by a tap placed in the lower part of the apparatus, and which is previously purified with the flame of a spirit lamp. The wort of the beer is put to ferment in a large white-metal vat, resting on a plank, and closed by a movable cover, this movable lid dropping into a groove which is kept full of water. As the wort arrives in a boiling state in this vessel, it destroys any germs which may exist there. When it is cooled, and the cooling may be rapidly aided by the use of external cooling water, the yeast is introduced through an opening in the lid. The aëration of the fluid is obtained by two tubes curved downwards, by one of which carbonic acid escapes, and by the other the air enters, after being previously filtered through a layer of cotton wool rolled round a cylindrical cage on metal wires which cap the extremity by which the air enters. This apparatus, like the foregoing one, reproduces exactly the conditions which are found to be necessary in the laboratory to prevent the introduction of external germs. The aëration by these two tubes is sufficient, for the carbonic oxide being heavier than air, they are placed in such a way as to form a syphon; moreover, during the fermentation, the wort is certainly kept in movement by the ebullition of the gas which escapes, so that the aëration, although less active than in some of the technical apparatus previously in use by brewers, is more than sufficient. By employing this procedure, secondary fermentations are no longer to be feared, and the spoiling of beer by secondary fermentation is almost entirely put an end to.

3. A third and profoundly interesting series of researches, which have had a great influence on agriculture, carried on by M. Pasteur, are those relating to *charbon* —the malignant pustule or black quarter of cattle and sheep. M. Pasteur has demonstrated that animals of the ovine and bovine species may be prevented from contracting the disease of *charbon* by inoculating them with attenuated germs, obtained by artificial cultivation of the specific minute organism which is ascertained to exist in the case of *charbon*, and to be the efficient cause of the disease. This attenuated preventive material for inoculation is obtained by the aid of what are known as cultivations of the germs made in special liquids. After the first inoculation with the highly attenuated virus, Pasteur has shown that the second inoculation may be made with a product of medium virulence, and that the animals thus twice vaccinated were unsusceptible of contracting the disease. Pasteur has further demonstrated that the bacteria of *charbon* is capable of retaining its vitality for several years in the earth, and that, when brought to the surface by earthworms, it is

capable of infecting the animals which eat the grass polluted by its contact, especially if the grasses or plants so eaten be hard, and such as to cause abrasions in the mouth and digestive tube.

4. *Silkworm Disease.*—M. Pasteur, after having assured himself that normally, and in good health, silkworms never contain, at any moment of their life, the bacteria or corpuscles seen for the first time by Guérin Menneville, demonstrated that the eggs of the worms, even when only slightly attacked, contained a great number of these corpuscles or bacteria, which developed in considerable quantities when the animal underwent its metamorphoses, and finally destroyed it; since its droppings polluted the leaves of the mulberry on which the silkworm feeds; and as healthy animals thus devoured them, and contracted the same disease, a single infected silkworm was capable of destroying a whole school of worms, and preventing the subsequent cultures from being developed.

M. Pasteur then laid down the rule that, in order to avoid the silkworm disease, it was necessary to choose with extreme care the animals which were to be employed for breeding. With this view he devised the following procedure:—When the female has laid its eggs it is at once destroyed. If a single corpuscle is found in its tissues, when crushed in water, the eggs are immediately burned. In the same way the several eggs of each hatching are carefully examined. If no corpuscles are discovered, the whole brood is preserved for culture; if any are found, the whole are immediately destroyed. Since that time the silkworm breeders have followed the rules of M. Pasteur. The implements for the purpose of recognizing the diseased worms consist of a microscope, two objectives, one with low power and one with high power, magnifying about four hundred times, and a small porcelain mortar for crushing the tissues of the worm or its eggs, some glass slides, and a flask of distilled water. By this application of scientific research to the silkworm industry, the silkworm disease has been almost wholly put an end to. Nearly all the silkworm growers, whether masters or servants, have learnt, by the aid of a very cheap little handbook, prepared by M. Pasteur, to recognize diseased worms or eggs from healthy eggs or worms, and thus a great industry, which was threatened with extinction, has been saved from the fate which threatened it.

5. *Fowl Cholera.*—After having demonstrated that this affection is caused by a micrococcus, M. Pasteur showed that if this micrococcus is cultivated in the manner which he indicates, and the micro-organism then obtained inoculated in a fowl, the fowls so vaccinated become proof against fowl cholera, even when they are placed in the midst of other infected fowls. These researches have a special and suggestive scientific interest, for he has shown that if you filter through plaster the liquid taken from one of the external foci of the disease in a fowl affected with fowl cholera, the filtered liquid thus inoculated will not give a healthy fowl the specific disease, but render it somnolent and inert for some hours, so that it may be concluded that the micro-organism secretes a material to which must be attributed the lesions which are observed in fowls suffering from fowl cholera.

Some idea may be obtained of the commercial value of the work done by M. Pasteur in his laboratories from the following facts and figures, which I have on good authority:—In three departments of the centre of France, after the silkworm disease had attacked the factories, the product yielded a value of less than 1,500,000 francs. Since the regulations laid down by Pasteur have been applied, the average value per annum, calculated on five years, in those departments has risen to more than 22,000,000 francs.

As to wine, there was a known loss of wine to the extent of 1,700,000 francs in four departments. Since heating on Pasteur's method has been applied, there has been saved of this loss at least 1,500,000 francs; the difference of 200,000 francs being alleged to be due to the carelessness or ignorance of small proprietors, who are unwilling to heat their wine. As there are in France about forty-five departments that make wine, the saving may thus approximately be estimated. I should add that there are twelve departments that make silk.

In respect to anthrax, the following was the official statement indicating the ravages made by this disease in France and foreign countries, and the reduction or mortality effected by these inoculations:—

	Sheep.	Oxen.	Horses.
1881.			
France	62,050	5977	142
Foreign countries . . .	12,500	1254	100
Total	74,550	7231	242
1882.			
France	270,040	35,654	1825
Foreign countries . . .	36,830	6169	200
Total	306,870	41,823	2025
1883.			
France	268,205	26,453	371
Other countries . . .	84,825	5777	975
Total	353,330	32,230	1346

The average mortality has been reduced by these inoculations in the proportion of 10 to 1 for sheep, and 15 to 1 for oxen, cows and horses.

In the last thirty years there has been an increase of life-duration of from 39·9 to 41·9 years, an addition of 5 per cent. human duration of life. The annual economy of life, on the least favourable calculation, during the last five years, has been equal to a saving of 36,000 lives per annum. The money saving on the last five years has been calculated, on good basis, by Captain Galton, to be in London alone nearly half a million of money per annum.

Review.

UNIVERSAL PHARMAKOPÖE. A Comparative Compilation of the Authorized European and North American Pharmacopœias. By Dr. BRUNO HIRSCH.*

The book which we have before us is the first of a monthly series to be completed in about twelve numbers.

The object is, as the title denotes, to prepare a way for an international pharmacopœia, to which end the author, Dr. Bruno Hirsch, has collected materials from all the official pharmacopœias in Europe and North America.

Acidum Aceticum Aromaticum.

	Belg.	Germ. I.	Græc.	Helv.	Russ.
Acid. aceticum . . .	72	25	72	30	72
Æther aceticus . . .	—	—	—	6	—
Oleum bergamott. . .	3	3	3	1	3
„ caryophyll. . .	9	9	9	2	9
„ cinnamomi . .	1	1	1	1	1·5
„ citri	6	6	6	1	6
„ lavandulæ . .	6	6	6	1	6
„ rosmarini . .	—	—	3	—	—
„ thymi . . .	3	3	—	1	3
Spir. aromaticus . .	—	—	—	40	—
	100	53	100	83	100·5

* Leipzig: Ernst Günther, 1884. Part I. Demy 8vo. Pp. 1-96. 2*s*.

One of the most distinctive features of the work is the method of tabulation, by which one can see at a glance the general differences between substances prepared in various countries, the tables for acetum aromaticum and phosphoric acid being especially worthy of notice.

For phosphoric acid there are two tables, one giving the quantity of nitric acid used, with the specific gravities of the resulting phosphoric acid for all countries; the other giving the percentage of H_3PO_4, with the quantity required to saturate two equivalents of normal soda solution, 1 c.c. of which = ·049 H_3PO_4.

Per cent.				
10	:	equivalents 980.		Diluted acid of the U.S.
11	:	„	890·9.	Russ.
13·8	:	„	710.	Brit., Den., Norw., Swed.
16·6	:	„	590.	Austr., Hung., Rom.
20	:	„	490.	Germ.
20·428	:	„	479·7.	Helv.
22	:	„	445·45.	Concentrated acid of Russ.
50	:	„	196.	Concentrated U.S.and Gall.

Two examples will show the working and value of the book.

Under the head of Acidum hydrocyanicum is placed the method generally adopted in obtaining the acid, followed by a table stating the quantities of potassium ferrocyanide and sulphuric acid, water and spirit used in various countries, together with the percentage of the resulting hydrocyanic acid after dilution for use.

Then the exception to the general method of making the acid, as in the Greek Pharmacopœia, by the action of ferrocyanide of potassium on phosphoric acid and absolute alcohol.

The properties of the substance follow next, with the peculiarities given in various pharmacopœias, and which are not universally recognized, as specific gravity, etc. The article closes with general tests, doses and methods of storing.

The article on Æther forms another good illustration, being present in all pharmacopœias, the method of production being the same, only varying in the quantity and strength of the sulphuric acid and alcohol used.

These quantities are carefully given with the methods of rectification and the specific gravities in the different pharmacopœias.

The specific gravities of ether coming over between the temperatures of 40° C. and 84° C. are also given, serving as a guide for a universal pharmacopœia.

In all places where formulæ must be used, both the notation as seen in English scientific works and the equivalent notation as used in the French Codex are employed.

Where any diversity of opinion exists as to which may be considered the right formula, Dr. Hirsch inserts the one which is in accordance with latest scientific theories, appending the different formulæ of the other pharmacopœias.

Thus ammonium carbonate receives the formula $NH_4HCO_3 + NH_4NH_2CO_2$, but additional formulæ are quoted, as $2NH_4O.3CO_2$ (Belg., Brit., Russ.), and $(NH_4)_2CO_3 + 2NH_4HCO_3$ (Austr., Gall., Hung.).

This will suffice to show the design and general arrangement of a treatise which affords another example of that conscientious and laborious attention to detail which characterizes German chemistry.

Whether Dr. Hirsch's compendium is to be the forerunner of a Universal Pharmacopœia is open to a doubt; but as a book of reference to guide those entrusted with he revision of future pharmacopœias, its concise tables nd well arranged matter cannot but be invaluable.

BOOK RECEIVED.

NATURE'S HYGIENE. A Systematic Manual of Natural Hygiene. By C. T. KINGZETT, F.I.C., F.C.S., etc. Second Edition. London: Baillière, Tindall and Cox. 1884. From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

ANOTHER UREOMETER.

Sir,—May I call Mr. Gerrard's attention to a little apparatus in general use in France, and known as the "Uréomètre Gillet?"

This "appareil" is a still simpler form of the "simple form of apparatus for estimating urea," a description of which appears in last week's issue of your Journal.

It has the threefold advantage of being simple in manipulation, accurate in result, and portable (the whole being packed in a neat pocket-case).

I enclose a description (in French) of the "Uréometre," which you may think worthy of publication. In any case I shall be pleased to show Mr. Gerrard the apparatus itself if he should care to see it. H. A. THOMAS.

*** The apparatus referred to consists of a graduated gas cylinder, closed at the top, and soldered at the upper end to a tube marked at the bottom to measure 2 c.c., and closed at the top by a hollow ground stopper. This stopper serves at the same time as a pipette and a reservoir for the hypobromite solution, aspiration being effected by means of an indiarubber pear. In operating the graduated gas cylinder is immersed in water to the level of the zero level, the hypobromite is introduced into the hollow stopper, 2 c.c. of urine is placed in the tube and the whole is hermetically closed. Then by slightly raising the apparatus the hypobromite solution is drawn out through the pipette into the tube and the nitrogen evolved is measured by the depression of the water in the gas cylinder.

A BOTANICAL PROBLEM.

Sir,—Witnessing the felling of some trees the other day, I was surprised to find in the centre of the duramen about 3 feet from the ground, of a common elm (*Ulmus campestris*), a cavity containing about 4 ounces of a reddish coloured substance. Now as the aperture could not have been formed mechanically I was curious to learn what the component parts of the peculiar earthy matter were. I found upon analysis that it was composed of about 30 per cent. of iron as an oxide, with lime, silica, potash and soda, and some organic matter. As this would appear to me to be an extraordinary amount of iron to have ascended in the sap to the point stated, and by its accumulation filling the niche in the trunk, I shall be glad to hear if any of your readers and brother chemists have witnessed a similar curious phenomenon.

Walton Place, East Molesey, Surrey. A. BALL.

Alpha, Ilfracombe.—See Dr. Squibb's paper on "Fluid Extract of Camellia," before, p. 183.

Fylde.—The subject has already been brought under the notice of our readers, and the evil must now be left to the only effective remedy, the exercise of a proper amount of caution in business transactions.

J. S. Ward (London).—Probably the positive opinion expressed by you has been arrived at without an acquaintance with the actual terms of the Act, which you are recommended to read.

R. Griffith.—If you refer to the *Pharmaceutical Journal* for Dec. 13, p. 47, and Dec. 20, pp. 490 and 500, you will see that the statement has not been allowed to pass without protest.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. James, Warden, Parkinson, Wood, Samuel, Chemicus, Pharmacist

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543, 544	,, white glass ,, earthenware caps, each in box	7	6	8	0
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558, 559	,, ,, ,, ,, extra tube and teat	10	0	11	0
552A, 552B	,, ,, ,, tin screw caps	8	0	9	0
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565, 566	,, ,, ,, ,, each in box	4	0	4	9
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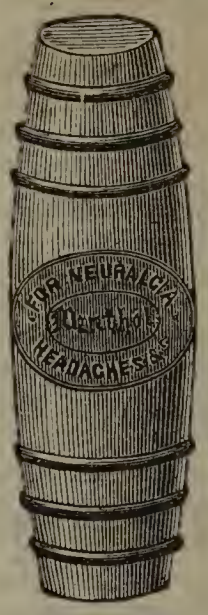

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WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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INTERMEDIATE TEA, 2s. per lb.
BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—
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Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

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CAUTION.—Circumstances which have come to the knowledge of Andreas Saxlehner, Buda Pest, Sole Proprietor of the Hunyadi János Spring, compel him to WARN the British Public against SPURIOUS IMITATIONS. To secure genuineness, purchasers should see that every bottle has on the LABEL the name of

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MINERAL WATERS.

FREDERICKSHALL (5 Cases, 6d. per Case less), 28/- Case, 30 bots.; 39/- Case, 60 ½-bots.

APOLLINARIS, 25/- Case, 50 bots.; 39/- Hpr., 100 ½-bots. Hprs. free. 5 °/₀ discount if 20. Carriage paid.

HUNYADI JÁNOS (10 Cases, 3/- and 5/- less), 30/- Case, 25 bots.; 50s. Case, 50 ½-bots.

SELTZER ..	11/-	Hpr.,	25 bots.
,, ..	15/-	Hpr.,	50 ½-bots.
PULLNA ..	18/-	Case,	20 bots.
,, ..	30/-	Case,	50 ½-bots
VICHY ..	31/-	,,	50 bots.
,, ...	27/-	,,	50 ½-bots.
CARLSBAD ..	37/-	,,	50 bots.
KISSENGEN ..	42/6	,,	50 ,,
SCHWALLBACH	27/6	,,	50 ,,
HOMBURG ..	40/-	,,	50 ,,
WILDUNGEN	43/-	,,	50 ,,

ENTERED AT STATIONERS' HALL.

CARLSBAD SALTS, ¼-bots., 20/- per doz.; ½-bots., 40/- per doz.; bots., 80/- per doz.

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BLOCK ICE.

Original Blocks, 2s. per Cwt.

Packing and Mats free.

Low quotations given for quantities taken from vessels while discharging.

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LITHIA, with Potash or Ammonia.
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POTASH AND SODA, B.P.
MINERAL ACID WATER.
PURE LEMONADE AND GINGER ALE.
Sole Makers of Stevenson's Aërated Lime Water.
The above may be had in Bottles or Syphons.

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W. KEMP & SON, HORNCASTLE.

BEST LIGHT CRUSHED LINSEED, STRICTLY pure.

GOOD LIGHT CRUSHED LINSEED, equal to what is generally sold as best.

YELLOW CRUSHED LINSEED.

All crushed in our own mills. Samples and special quotations on application.

Above can be forwarded when required from our depôt in Birmingham.

GENUINE SHEEP OINTMENT, of first quality and guaranteed strength. Special carriage paid quotations on application.

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FOR COUGHS.

ESTABLISHED

—(1824.)—

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PURE

FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of

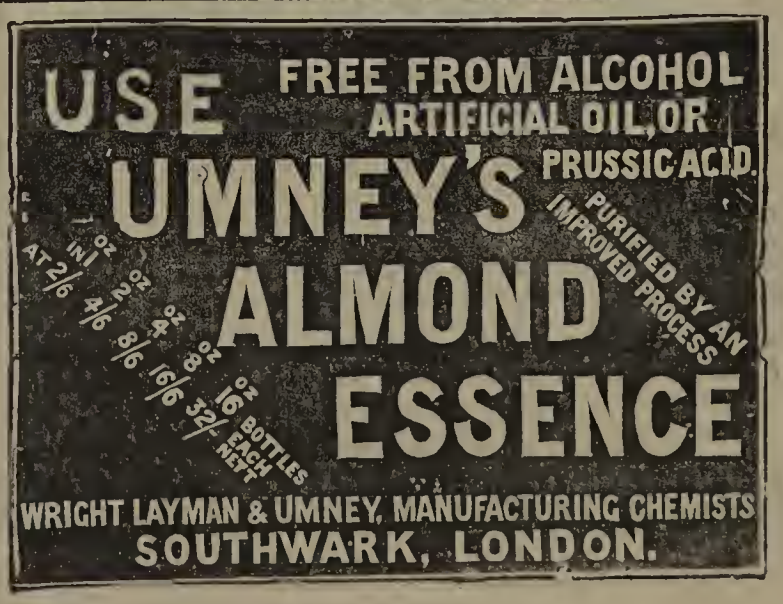
ACIDITY, INDIGESTION, HEARTBURN, GRAVEL & GOUT

Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

His **FLUID CAMPHOR** is a valuable remedy for Sleeplessness and Weak Nerves.

Bottles, 1s. and 2s. each.



HOGE'S HOREHOUND HONEY

FOR THE PROMPT RELIEF OF CHEST COMPLAINTS, COUGHS, AND SORE THROATS.

SUPPLIED BY ALL CHEMISTS.

The popularity of this natural and strongly medicinal remedy not due to advertising so much as to its own inherent virtues. is gathered by the honey bees from the horehound honey ossoms.

The following Testimonials are not from obscure and unknown eople, but from some of the leading and best known in the ingdom. No medicine introduced to the public has ever deerved and received such patronage and success.

HAWTHORN LODGE, FINCHLEY NEW ROAD, N.W.,
Messrs. W. M. HOGE & Co., London. *March* 30, 1883.

Gentlemen,—I have much pleasure in stating that I consider your "Horehound Honey" the most wonderful remedy I have ever tried, possessing properties which are nothing short of marvellous for the cure of affections of the throat and chest. I shall never be without a bottle of "Horehound Honey."

Yours very truly, MARIE ROZE.

Your "Honey" is delicious. ELLEN TERRY.

The Lord Mayor of London orders it.

MANSION HOUSE, LONDON, E.C., *September* 28, 1883.

The LORD MAYOR would thank Messrs. W. M. HOGE & Co. to send him half a dozen of their "HOGE'S Horehound Honey," which has been *well recommended* to him.

W. L. BRIGHT, Esq., son of the Right Hon. JOHN BRIGHT, M.P., says "HOGE'S Horehound Honey" CURED his father of a bad cough.

What the Clergy say of it.

ELY, CAMBS., *May*, 1883.

The Rev. C. D. KINGDON has great pleasure in bearing testimony to the excellent properties of "HOGE'S Horehound Honey" for preaching. It makes the voice clear and pleasant, and takes away all that huskiness in the throat which is so uncomfortable to preacher and congregation.

From the Champion Billiard Player.

38, MARYLANDS ROAD, WESTBOURNE PARK,
Messrs. W. M. HOGE & Co. *Oct.* 27, 1883.

Gentlemen,—I have much pleasure in certifying to the excellence of your "Horehound Honey." I have found great relief from taking it, and strongly recommend it for coughs.

Yours faithfully, JOHN ROBERTS, Jun.

What it did for Geo. F. Black, Esq.

7, SUFFOLK LANE, CANNON STREET, E.C.,
Messrs. W. M. HOGE & Co., London. *London, April* 20, 1883.

Gentlemen,—Having suffered for many years with irritation of the throat and chest, I never found any remedy to relieve the irritation until I purchased a bottle of your "Horehound Honey," which I did a few days since. I want to inform you it had a wonderful soothing effect, affording relief at once. Please send me one dozen bottles, and oblige yours truly, G. F. BLACK.

Price 1s. 1½d. per Bottle. { *To be had of any Chemist.*

WHOLESALE BY

HOGE'S HONEY COMPANY (Limited)

12, GT. EASTERN STREET, LONDON, E.C.

THE ORIGINAL

ARNICATED

WHITE FELT

CORN AND BUNION PLASTERS,

INVENTED AND ESTABLISHED BY

HENRY YOUNG,

A.D. 1846,

AND FAVOURABLY KNOWN ALL OVER THE GLOBE.

SUPPLIED BY ALL WHOLESALE HOUSES.

N.B.—Please see that YOUNG'S Goods are supplied, as there are many worthless imitations.

Manufactory, 72, Clerkenwell Rd. London, E.C.
(LATE OF CARTHUSIAN STREET.)

GOLD MEDAL, ADELAIDE, 1881.

ESTABLISHED 1824

TRADE MARK NEEDHAM'S TRADE MARK

POLISHING PASTE

AFTER BEING IN USE FOR OVER 50 YEARS, IS ACKNOWLEDGED TO BE THE BEST CLEANER AND POLISHER OF BRASS COPPER BRITANNIA METAL &c &c ALSO

PICKERING'S

FURNITURE POLISH

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SHEFFIELD

Joseph Pickering & Sons, Albyn Works, Sheffield.

CHEMISTS' CASES.

SHIPPED f.o.b. in London, or sent, *carriage paid*, to any town in the United Kingdom on receipt **£10 10s.**

THESE CASES CONTAIN—

Doz.		*at per doz.*	£	*s.*	*d.*
3	Eno's Fruit Salt, 2/9 size	21/-	3	3	0
1	Do. do. 4/6 „	35/-	1	15	0
6	Pear's Soap, 6d. Tablets (unscented)	3/4	1	0	0
3	Do. do. 1/- „ (scented) ...	6/8	1	0	0
	(*Or 6 doz. unscented 6d. at buyer's option.*)				
1	Seigel's Syrup, 2/6 size	21/-	1	1	0
1	Jeyes' Perfect Purifier, 2/-, glass bots.	12/6	0	12	6
	(*Or 3 doz. 6d. size at buyer's option.*)				
1	Do. do. 1/- glass bots.	7/-	0	7	0
2	Do. do. 6d. „	4/-	0	8	0
3	Do. do. 3d. „	1/6	0	4	6
1	Do. Sanitary Powder, 1/-, decorated tins	7/-	0	7	0
2	Do. do. 6d. do.	4/-	0	8	0
2	Do. Dog Soap, 6d. tablets ...	2/-	0	4	0
			£10	10	0

Cases containing half the above quantities, **£5 7s. 6d.**

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LONDON, E.C

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Glass Bottle Manufacturers,

10, Gt. Northern Goods Station

KING'S CROSS, LONDON,

Invite the attention of Chemists and others to the large variety of Glass Bottles, &c., that they supply, and solicit orders for same.

DISPENSING.—Green and White Flint, of all sizes and shapes.

PERFUMERY.—White Flint, in different styles.

FEEDING BOTTLES.—"Our Babies' Bottle," in Green and White Glass, with white, brown or black fittings.

Illustrated Catalogues and detailed Price Lists of above and many other kinds forwarded on application.

PETROLEUM JELLY

EQUAL TO AND CHEAPER THAN VASELINE.

SANITARY FLUID AND SHEEP DIP,

THE CHEAPEST AND BEST DISINFECTANT.

Grease, Pitch, Asphalte, and all products of Tar and Rosin.

Samples and Prices on application.

GRINDLEY & CO. POPLAR, LONDON, E.

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MR. CUPISS, Diss, Norfolk, Proprietor of the Constitution Balls, will have pleasure in supplying the Trade, on application, with Bills for distribution, with valuable Testimonials recently received, also attractive Posters, forwarded by Parcels Post.

To prevent error, it is desirable to send a card of address.

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MANUFACTORY—
176 & 177,
STRAND, LONDON.

Lavender Water.

In Bottles, from 1/ to 6/; in Cases, from 3/ to 15/6.

Trade Terms on Application.

FOUND DEAD.

SUDDEN DEATH by SANFORD'S RAT POISON.—"In my wheat ricks I found 130 rats killed by one dressing with it."—J. U. Paine, Farmer, Caxton. "Sanford's Rat Poison answers well. I find it the best I ever used."—J. Long, Henlow. It is, without doubt, the best ever introduced. Price 6d., 1s. and 2s., of **SANFORD & SON, Sandy, Beds.** Also MICE POISON for Dressing Stacks.

LIBERAL TERMS TO CHEMISTS.

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GUARANTEED CIRCULATION

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Assistants Wanted, Apprenticeships Wanted, Businesses for Disposal, Wanted to Purchase, also Advertisements of a general character (in column).—Seven lines (50 words) or less, 4*s.* 6*d.* Each line (seven words) extra, 6*d.*

Special terms for **Assistants seeking Engagements** *only.*—Four lines (28 words) or less, 2*s.* 6*d.* Each line (seven words) extra, 6d.

Postage stamps *cannot be received*, but payment may be made either by **Cash** in a Registered Letter, or by **Cheque** crossed London and County Bank, by **Postal Order**, or by **Money Order**, payable at Regent Street, W., to J. & A. Churchill.

Advertisers are requested to observe :—

1.—That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

2.—That letters addressed to initials or to fictitious names at a Post Office are not taken in, but are at once sent back to the writers by the Post Office Authorities.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers.

Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months ; 10*s.* for six months ; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

J. & A. Churchill, 11, New Burlington St., London, W.

NOTICE TO ADVERTISERS.

On account of the occurrence of Christmas Day this week, the Pharmaceutical Journal is published on Wednesday instead of Friday. Advertisements received after Ten o'clock on Tuesday morning were too late for insertion in this week's issue, but they shall appear in the next number.

MAGIC LANTERNS

AND Dissolving Views.—Before purchasing see the Patent Pamphengos. B. Malden, Esq., compares it to limelight. The Triplexicon, 3½ double condensers, rack, and pinion, £2 2s. Duplexican, 3½, 30s., most powerful oil light in the world. Magnificent Triples and Biunials, from £6 6s. Hundreds of testimonials. Pamphlet 2d. Photographs 1s. 25,000 slides. Novelties—Coronation of the Czar, War, Scripture Hymns, Tales. Cheapest and best in the world. Illustrated catalogues, 177 pages, 6d.—Hughes, Brewster House, 82, Mortimer Road, Kingsland, N., London. Second-hand Lanterns, bargains. Great show of slides in the art gallery, a sight to be seen.

THE PERFECT SURGICAL BANDAGE

Preferred to all Makes hitherto used.

In Cases of Twelve Six Yard Rolls, 2 inches wide, 3s. 9d.; 2½ inch, 4s. 6d.; 3 inch, 5s. 6d.; or, case containing twelve six yard rolls of each width, 13s.

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Postal System of Instruction

In connection with the Westminster College, has been established for the express purpose of preparing for the various examinations of the Pharmaceutical Society students residing in the country, or those unable to attend a School of Pharmacy.

Pharmaceutical Preliminary	**Fee**	**10s. 6d.**
Pharmaceutical Minor ...	**Fee £1**	**1s. 0d.**
Pharmaceutical Major ...	**Fee £1**	**1s. 0d.**
Medical Preliminary ...	**Fee £1**	**1s. 0d.**

OPINIONS OF THE PRESS.

"The postal system, which Mr. WILLS has introduced and carried out with the most complete success, is an extraordinary advantage to Pharmaceutical students living in the country, as it tenders them an opportunity of working at their own quarters, miles away from London, assisted by an efficient London master. We have visited Mr. WILLS' establishment, and, having thoroughly gone into every particular in connection with the working of the system, have much pleasure in recommending it. With the facilities Mr. WILLS has at command, we can scarcely wonder that the whole of his students pass without difficulty."—*The Magazine of Chemistry and Pharmacy.*

For Prospectus and further particulars, apply to

Messrs. WILLS & WOOTTON,

Trinity Square, London, S.E.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

INSTITUTED 1ST OCTOBER, 1868.

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

SEVENTEENTH SESSION, 1884-5.

The next term will commence on the 12th January, 1885.

For Fees, Syllabus, &c., apply to W. BAXTER, Secretary.

LAC BISMUTHI

LAC BISMUTHI ET CERII, &c.

SYMES & CO., LIVERPOOL.

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BOWLES & CROSS,
MEDICAL PRINTERS,
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THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

The following students of the Central School of Chemistry and Pharmacy succeeded in passing their examinations held in London this month:—

Major.

Mr. T. B. BLYTON | Mr. J. C. SAUL
Mr. G. W. WATTS

Of these candidates, 2 were successful at their first attempt.

Minor.

Mr. S. J. BAKER	Mr. J. E. MOORE
„ T. J. BARTON	„ C. J. REES
„ A. CAMM	„ S. SNOXELL
„ W. EVERETT	„ R. THATCHIN
„ J. B. MARTIN	„ W. M. WATSON
„ F. MOORE	„ W. J. WRIGHT

Of these 12 candidates, 8 were successful at their first attempt. The next course of Lectures will commence on Friday, January 2nd, 1885.

For Prospectus apply to

Messrs. LUFF & WOODLAND.

JUDD'S CLASSES.

MORNING, EVENING AND POSTAL.

Join now for April Minor. Every exam. proves that students in London can pass without leaving business. The most successful in the metropolis. Send for my new prospectus of Aids to Memory and Examination.

Mr. H. JUDD, 31, REGENT SQUARE, W.C.

PHARMACEUTICAL PRELIMINARY, LONDON MATRICULATION, AND ALL MEDICAL PRELIMINARIES.

RAPID and thorough preparation, privately and in class. Postal Tuition for these Examinations and Bell Scholarship. For particulars, enclose stamp, Mr. A. DAWES, 1st B.A. Lond., Adderstone, Vardens Rd., New Wandsworth, S.W. (close to Clapham Junction Station).

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WESTMINSTER COLLEGE
OF
Chemistry & Pharmacy.

The next Course of Lectures on Chemistry, Botany, Pharmacy, Materia Medica and Physics will commence on Monday, January 5th, 1885.

Students intending to enter on the above date should send in their names at once, so that benches may be reserved for them.

FEES—MINOR OR MAJOR.

(*Inclusive of Lectures, Classes, and Laboratory Instruction.*)

To the February Examination ...	£5 5s.
To the April „	£8 8s.
Six Months' Course	£10 10s.
Twelve Months' Course (Minor and Major)	£15 15s.

EXAMINATIONS HELD IN LONDON.

At the December Examinations the following Students of this College were successful:—

MAJOR.

Mr. A. Banks ... ... Stratford-on-Avon

MINOR.

Mr. W. Ballard	Abingdon
„ F. W. Biggs	Lichfield
„ W. Bishop	Bridgnorth
„ G. Brigham	Hull
„ W. J. Collett	Nantwich
„ O. A. Clark	Bury St. Edmunds
„ F. B. Dell	Llanelly
„ P. Gray	Bristol
„ W. Lowther	Swansea
„ W. Parker	Wainfleet
„ H. Parks	Cobridge
„ J. Poole	Birmingham
„ E. T. Sage	Atherstone
„ W. W. Smee	Axminster
„ A. W. Smith	Redditch
„ C. H. Temple	Winchester
„ J. F. Thielé	London
„ J. Tibbits	Lincoln
„ C. P. Tregellas... ...	London
„ J. A. Wheldon	Darlington

APOTHECARIES' HALL.

Mr. G. Brigham	Hull
„ W. Bishop	Bridgnorth
„ D. Thomas	Brynammon
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For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON,

Trinity Square, Borough, London, S.E.

THE EDINBURGH SCHOOL
OF
Pharmacy and Chemistry
MARSHALL STREET.

The next Session begins on Monday, 5th January next. For particulars apply to R. Urquhart, Secretary.

× × × ×

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(*From the Royal School of Mines*),

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WHAT IS THE CAUSE OF THE GREAT MORTALITY AT the recent Examinations? Want of systematic, *individual* guidance by a long experienced and most successful tutor. Why attend long, expensive courses at public schools, when a few weeks private tuition with me will suffice? NO demonstrators. Postal Students receive my notes, thereby placing them on a par with my private pupils. Books unnecessary, notes sufficient. Preliminary Candidates prepared privately or by post. Enclose stamp for terms, &c.

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ENGAGEMENTS WANTED.

SPAIN or Spanish America.—In a Drug House trading with above countries. Home or abroad. Either in office or to travel. Spanish written and spoken. H. Woodcock, Brighouse.

ADVERTISER (26) requires situation where opportunities would be afforded of becoming thoroughly acquainted with the business. Only slight previous knowledge. Good references. C. A., 4, Market St., Guildford.

AS Assistant till end of February, in first-class Dispensing business. Services given in return for board and lodging. 7 years' experience. Good references. H. D., 103, Upper Kennington Lane, S.E.

AS Assistant, in London. Early in January. With time for study. Moderate salary. Good town experience. B. J., 22, Battersea Rise, Clapham Common, S.W.

THE advertiser, 21 years, a student of the Society, a quick and accurate Dispenser, is anxious to enter into an engagement which will give him time for the lectures at Bloomsbury Sq., and for reading, as he will reside with friends in London. A small salary will be required. Geo. Cook, Post Office, Canterbury.

AS Assistant.—A foreign Assistant, speaking French and Italian, wishing to complete his knowledge of English. 7 months' London experience. Borney, 49, Haymarket.

AS Junior or Dispenser to a Surgeon. In or near London. 5 years' experience. Age 22. Time required for study. Hall qualification. Disengaged. T. Dryden, Landore, near Swansea.

AS Assistant, in good class Retail and Dispensing. Minor qualification. Age 23½. C. B. Southwell, 28, High St., Bridgnorth, Salop.

THE friends of a youth, 16, who has passed his Preliminary, desire to Apprentice him for 3 years in a good class house. Has had 4 months' experience. Premium not to exceed £30. X., Mrs. J. James, Rolle St., Exmouth.

AS Junior. By end of January. Height 5ft. 10½in. Age 20. 6 years' experience. A. J. Wing, 5, New Court, King St., Cambridge.

AS Junior. Good references. Passed Preliminary. Height 5ft. 8in. Age 20. Now disengaged. H. V., 30, Western Rd., Hove, Brighton.

AFTER Christmas.—A situation wanted in a good Dispensing place in London. Good experience. Would have no objection for time to study. 2½ years' good references. Age 25. P. W., 36, Spurstowe Rd., Hackney.

ASSISTANTS WANTED.

FIRST-CLASS Counter Hand and Dispenser, for one of best towns in Ireland. Accustomed to extensive Retail and Dispensing. None but thoroughly competent need apply. State age, salary (out-door), references, enclosing copies of testimonials (which will not be returned), to Stanley Harrington, Patrick St., Cork.

END of January. A competent, trustworthy Assistant, about 25 years of age, for Retail Counter. Of good address and accustomed to first-class country trade. One seeking a permanency preferred. 4 kept. References, salary, carte, with full particulars, to Chave & Jackson, Chemists, Hereford.

JUNIOR Assistant, out-door, steady, obliging, and accurate Dispenser. One with a knowledge of Dentistry preferred, or one wishing to learn Mechanical Dentistry would be treated with. State age, height, salary required, and references, also enclose photo., to Dentist, care of Messrs. Evans, Sons & Co., Liverpool.

IMMEDIATELY.—A qualified Assistant, to take charge of a light Retail business. Single. In-door. Good salary given to a suitable person. Preference given to a total abstainer. Apply, with particulars as to references, age, &c., to Chemist, Ferndale, Pontypridd.

A THOROUGHLY competent Assistant to take the Management of the Dry Counter. Apply to Philip Harris & Co., Wholesale Druggists, Birmingham.

EARLY in January.—A competent Assistant, indoors, for an English and Foreign Pharmacy, where a knowledge of French is essential. Also a Junior acquainted with general Retail and Dispensing, but French not indispensable. Applications not replied to in three days declined. Pharmacist, American Exchange in Europe, 449, Strand, W.C.

TO Students.—For a good class Surgeon's Retail, an Assistant to give part of his time in return for board and lodging. Must thoroughly understand the Chemists' business. Plenty of time for reading and lectures, but no salary. Apply, personally if possible, to Dr. Chandler, 22, Battersea Rise, Clapham Common, S.W., very near Clapham Junction.

AN Assistant of good address, who has the Minor qualification. About 22 or 23 years of age. Apply, with references, stating salary required, T. & W. Southall, Dispensing Chemists, Birmingham.

APPRENTICE, by Chemist, in one of the best market towns in Lincolnshire. Good home and every facility for learning the business. Apply, A.B., Messrs. Hodgkinson, Stead & Treacher, 198, Upper Whitecross St., London, E.C.

BY first week in January.—Assistant, about 22 years of age, accustomed to good class business. Apply, stating height, salary, references, &c., enclosing carte (to be returned), to John Ekins, Chemist, 97, High St., Bedford.

OUT-DOOR Assistant, for country trade, age 21 to 24. Qualified preferred. Middle January. State salary. Sturton, Fitzroy St., Cambridge.

A GOOD Junior (single-handed), for a good class Family business. One accustomed to a brisk Retail, able to Prescribe, and of obliging business habits. Apply, stating usual particulars, references, &c., and when disengaged to Woollatt, Chemist, Taunton, Somerset.

A JUNIOR or Improver. Address, with photo., stating age, references, and salary required, H. Allen, Basingstoke.

A JUNIOR, about 19. Early in January. Close at 8. No Sunday work. Write, stating age, experience, and salary required, R. E. Charles, Chemist, Brecon.

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MESSRS. HINE GILBERT have for transfer:—Surrey. High class Retail and Dispensing business. Returns £800. Long lease. At nominal rent. About £500 cash would purchase. Another. Returns £1200, at full prices. £1100 required. Sussex. Returns £400. Exceptionally good profits. Price £250. West of England. Good town. Death vacancy. Returns nearly £800. Cash £400. Apply, 17, Hart St., Bloomsbury.

AN old-established Mixed Drug, Dispensing, Agricultural, Seeds, Hops, &c., Business, in a capital Market Town on the borders of Wales, the Proprietor retiring. Apply, H. H., Messrs. Evans, Sons & Co., Hanover St., Liverpool.

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